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REVIEW OF APPLIED MYCOLOGY

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WINSTEAD (N. N.), AYCOCK (R.), & JENKINS (J. M.). **Reactions of Watermelon plant introductions and varieties to downy mildew in North Carolina.**—*Plant Dis. Reptr*, **41**, 7, pp. 620–622, 1957.

Plant introductions 179660 and 179875 of watermelon were highly resistant in 1956 to downy mildew [*Pseudoperonospora cubensis*: **35**, p. 145], with 169289, 169290, and 171392 somewhat less so. The Royal Golden variety was also resistant to or tolerant of this disease and 189295, 164460, and 183399 had shown some resistance in 1954. All other varieties tested were susceptible.

COX (R. S.). **Control of downy mildew of Lettuce in the Everglades.**—*Plant Dis. Reptr*, **41**, 5, pp. 455–459, 1 diag., 1 graph, 1957.

In further tests in the Florida Everglades dithane Z-78, 3 lb./100 gal. in 1955, parzate 2 lb. in 1956, and manzate $1\frac{1}{2}$ lb. in 1956, gave excellent control of lettuce downy mildew (*Bremia lactucae*) [**35**, p. 264]. The importance of adequate coverage is stressed; after heading 3 nozzles were used, 1 above the plants and the others on either side, parallel with the soil line.

KREITLOW (K. W.), BOYD (HELEN C.), CHAMBERLAIN (D. W.), & DUNLEAVY (J. M.). **A bibliography of viruses infecting the Soybean (Glycine max (L.) Merr.).**—*Plant Dis. Reptr*, **41**, 7, pp. 579–588, 1957.

A compilation of 170 references.

CHIU (W.-F.). **Purple stain fungus (Cercospora kikuchii Matsumoto et Tomoyasu) of Soybean seeds.**—*Acta phytopath. sinica*, **1**, 2, pp. 191–204, 1 fig., 1 graph, 1955. [Chinese. Abs. from English summary. Received 1957.]

In N. China infection of soybean seed by *C. kikuchii* [**28**, p. 155] causes both purple stain and dark brown and greenish black specks.

In culture on a synthetic agar medium growth was increased when one of the mineral constituents, especially $FeCl_3$ or $MgSO_4$, was removed. Peptone (1%) in place of KNO_3 reduced growth on agar but gave the highest yield of mycelium in a liquid medium. NO_3 was a better source of nitrogen than NO_2 or NH_4.

On agar, growth was best at 28° C., sporulation at 20–24°, and the greenish black pigment was usually produced at 32°. In a liquid, depending on the medium employed, 3 pigments were produced; red-purple, yellow, and greenish olive, the last of which was not excreted into the surrounding medium.

YU (T.-F.). **Black rot of Yam Bean (Pachyrrhizus tuberosus Spreng.).**—*Acta phytopath. sinica*, **1**, 2, pp. 177–182, 1 fig., 1955. [Chinese. Abs. from English summary. Received 1957.]

In Yunnan Province, China, an internal black rot was observed in marketed tubers of *P. tuberosus*. Infection probably occurs before lifting. An isolate from diseased tubers strongly resembling *Pythium spinosum* failed to cause damping-off or wilt of young seedlings but was slightly parasitic on inoculation to the tubers. *P. irregulare* and *P. intermedium* were also isolated but failed to produce the characteristic symptoms of the disease.

GARREN (K. H.) & DUKE (G. B.). **The Peanut stem rot problem and a preliminary report on interrelations of non-dirting weed control and other practices to stem rot and yield of Peanuts.**—*Plant Dis. Reptr*, **41**, 5, pp. 424–431, 1 graph, 1957.

At Holland, Virginia, infection of groundnuts by *Sclerotium rolfsii* [**35**, p. 575] was less and yield greater when 'non-dirting' weed control was practised than when

weeds were smothered by throwing soil on the crop. Treatment with the herbicide DNBP (4, 6, dinitro *o*-sec. butylphenol) appeared to be beneficial in both cases. PCNB applied as a soil drench at 12 lb./acre 10 weeks after planting reduced above-ground infection and damage to pods and kernels. Deep burial of surface litter in an infested field reduced stem rot and increased yield in Virginia Bunch 46–2.

LAMBERT (E. B.) & AYERS (T. T.). **Thermal death times for some pests of cultivated mushroom (Agaricus campestris L.).**—*Plant Dis. Reptr*, **41**, 4, pp. 348–353, 1957.

Of the diseases and competitors of the cultivated mushroom subjected to moist heat at Beltsville, Maryland, brown blotch (*Verticillium* spp.), *Mycogone perniciosa*, *Scopulariopsis fimicola*, *Pseudomonas tolaasii* [**35**, p. 576], and mummy disease [cf. **36**, p. 231] are eliminated by 4 hr. exposure to 130° F.; 2 unidentified yellow moulds [cf. **35**, p. 414], lipstick mould (*Geotrichum* sp.) [cf. **36**, p. 373], *Papulospora byssina*, *Chaetomium olivaceum* [cf. **32**, p. 59], *Trichoderma* (?) *koningi* [cf. **30**, p. 555], and '*Sporotrichum* mould' [unspecified] by 16 hr. at 130° or 6 hr. at 140°; and truffle disease (*Diehliomyces* [*Pseudobalsamia*] *microspora*) [cf. **36**, p. 231] by 5 hr. at 180°. The thermal death point of *Coprinus* spp. [loc. cit.], bacterial pit disease [cf. **34**, p. 206], La France disease [**36**, p. 511], *Fusarium* spp. [cf. **34**, p. 436], and certain small spored yellow moulds and minor diseases is undetermined. Growers are advised to double the treatment period during pasteurizing or in empty houses in order to ensure against heat-resistant strains, and to kill dry spores may require temperatures 10–20° higher than the above.

This information is also published in *M.G.A. Bull., 1957*, 93, pp. 295–300, 1957.

SCHISLER (L. C.). **A physiological investigation of sporophore initiation in the cultivated mushroom, Agaricus campestris L. ex Fr.**—*Diss. Abstr.*, **17**, 5, p. 958, 1957.

Following a study at Pennsylvania State University of mycelial respiration in *A. campestris* during sporophore formation the author discusses current theories of the function of the casing soil layer, and proposes another. This postulates that some hormone-like substance, liberated by the mycelium, must accumulate to a certain concentration in the compost before the initiation of sporophores can begin. The casing layer, by inhibiting the volatilization or diffusion of the substance, would assist in its accumulation.

KUNDERT (J.). **Die Peronospora der Rebe und ihre Bekämpfung im Jahre 1956.** [The *Peronospora* of the Vine and its control in 1956.]—*Schweiz. Z. Obst- u. Weinb.*, **66**, 7, pp. 160–163, 2 graphs; 8, pp. 182–188, 1 graph, 1957.

Peronospora [*Plasmopara viticola*] attack in the Wädenswil district of Switzerland in 1956 was late and weak. Fungicidal treatments are compared as in previous years [**35**, p. 577].

CIFERRI (R.). **Peronospora ed Oidio della Vite nel 1956.** [*Peronospora* and *Oidium* of the Vine in 1956.]—*Progr. agric., Bologna*, **3**, 6, pp. 697–699, 1 fig., 2 col. maps, 1957.

A short, popular account of the distribution of vine downy mildew [*Plasmopara viticola*: **36**, p. 634] and *Oidium* [*Uncinula necator*] in Italy in the spring of 1956.

CHU (W.-C.), TSENG (H.), & CHEN (Y.-H.). **A preliminary study of the efficacy of various fungicides used in disinfecting Grape seedlings for the control of anthracnose.**—*Acta phytopath. sinica*, **1**, 2, pp. 205–210, 1955. [Chinese. Abs. from English summary. Received 1957.]

Anthracnose (*Elsinoe ampelina*) [**24**, p. 441] is one of the most serious diseases of

vine in N. and N.E. China. Of the fungicides tested for its control, Reimer's solution (0·2%) was the best but retarded seedling growth; ammonium sulphate (15%) is considered the most promising.

Horticultural and Research notes. Report of the Nyah-Woorinen enquiry committee, 1956.—*Aust. dried Fruits News*, **31**, 4, pp. 49–54, 1956.

Notes on investigations into vine diseases (pp. 53–54) indicate that the rainfall and humidity figures for the last 25 years show black spot [*Elsinoe ampelina*: **34**, p. 767] to be affected chiefly by rainfall; spores germinate over a wide range of temperatures, but only if free water is present for approximately 24 hr., and after germination further rainfall is necessary for infection. If sprayed when young, healthy mature leaves, resistant to the disease, form a late season barrier between the cankers and new foliage.

Excellent control of *Oidium* [*Uncinula necator*: loc. cit.] was given by sulphur preparations. Colloidal sulphur may be added to ziram sprays early in the season, after which Bordeaux mixture used to control downy mildew [*Plasmopara viticola*: **35**, p. 354] will also control *U. necator*, a final application of sulphur then being needed in Dec. *U. necator* is favoured by warm, dry weather, interspersed with occasional light rains.

Horticultural and research notes. Research in Western Australia.—*Aust. dried Fruits News*, **32**, 1, pp. 18–28, 30–31, 33–35, 1957.

A report by H. P. Olmo, of the University of California, on his visit to Western Australia in 1955, refers to virus diseases of the vine (p. 34). It is stated that 'pale mosaic' is so widespread on the Sultana variety as to suggest that much of the propagating wood must have carried the virus when imported. Affected plants are only slightly weaker in growth, the young leaves being abnormally pale green. Vine yellow mosaic virus [cf. **34**, p. 343] is widespread on young vines in Grenache. 'Fusion spot' appears to be identical in symptoms to 'true mosaic' in France [? vine infectious degeneration virus: cf. **36**, p. 454], causing similar light-coloured fusion areas on the smaller veins which are particularly noticeable on thin-leaved varieties such as Sultana and Chasselas Doré.

Taylor (R. H.). **Oidium (powdery mildew) of the Grape.**—*J. Dep. Agric. Vict.*, **55**, 7, pp. 465–472, 2 fig., 1957.

Following an historical review and general notes on oidium disease [*Uncinula necator*] of vine the author reports spray trials at Glenrowan in N.E. Victoria during 1954–56.

In 1954–5 captan, zineb, and ziram were compared with full-strength Bordeaux mixture on Brown Muscat. Results at harvest were obscured by heavy attacks of downy mildew [*Plasmopara viticola*] and mould [*Botrytis cinerea*], but the level of *U. necator* attack was estimated in the dormant season from the extent of cane dieback. The three organic fungicides gave poor control.

In one trial in 1955–6 zineb, captan, zineb+copper oxychloride, colloidal copper, and half-strength Bordeaux mixture applied 3 times late in the season were compared with full strength Bordeaux for control of both powdery and downy mildews, the level of attack being estimated as before because of mould damage. Only full strength Bordeaux was satisfactory [cf. **29**, p. 347; **33**, p. 580].

In another sulphur dusts and colloidal sulphur (with or without the wetter, lauryl sulphate) were compared with mildex (di-nitro capryl phenyl crotonate) against *U. necator* only, assessment being made at harvest by counting the number of infected unmarketable bunches in 100 taken at random, and in the dormant season by counting the lesions on 5 canes taken at random from 2 centre vines in each plot. Sulphur dusting was best, followed by colloidal sulphur with wetter, colloidal sulphur alone, and mildex, in that order. The first three all gave good control.

In conclusion it is recommended that colloidal sulphur (4 lb./100 gal.) should be incorporated in the ziram sprays for black spot [*Elsinoe ampelina*], and also in Bordeaux when *U. necator* is prevalent. Later in the season, when routine spraying is at an end, sulphur dusts are suitable, These should be applied once in Dec. about 3 weeks after the last downy mildew spraying, and again a month later.

Branas (J.). **Le black-rot en Savoie.** [Black rot in Savoy.]—*Progr. agric. vitic.*, **74**, 33–34, pp. 81–82, 1957.

Black rot [*Guignardia bidwellii*: **26**, p. 228] caused considerable damage to vines at Montmélian and in other Savoyard districts of France in 1957, local characteristics of the disease being the comparative rarity of leaf spots and the large number of lesions on the fruit. Jacquère was highly susceptible, Grand Noir de la Calmette less so, while Mondeuse, Marsanne, and Bergeron were resistant. New [unspecified] fungicides were no more effective than Bordeaux mixture. Sulphur spraying should be started at a very early stage, when the young branches are 2 to 3 cm. long, treatment in July or Aug. being useless.

Baldacci (E.), Fogliani (G.), & Betto (E.). **La lotta antiperonosporica nella Vite con i prodotti a base di zineb.** [The control of Vine downy mildew with products based on zineb.]—*Pubbl. 87, Raccolt. V, Ist. Pat. veg. Milano*, 55 pp., 5 diag., 9 graphs, 1956.

Full details are given of spraying tests against vine downy mildew [*Plasmopara viticola*] carried out in the Po valley during 1952–55, in which materials containing zineb were tested against Bordeaux mixture. Most of the results have already been noticed [**36**, p. 85].

Peyer (E.). **Ergebnisse zehnjähriger Prüfungen von veredelten Reben auf verschiedenen amerikanischen Unterlagensorten.** [Results of ten years' trials of grafted Vines on different American stock varieties.]—*Annu. agric. Suisse*, (**58**), N.S. **6**, 4, pp. 373–415, 1 fig., 5 diag., 4 graphs, 1957. [French summary.]

The object of the trials in 9 localities herein reported in detail was to determine which American vine stocks, grafted with the 2 varieties commonly grown in eastern Switzerland, Blue Burgundy (Pinot Noir) and Riesling × Sylvaner, were best adapted for cultivation in areas threatened by chlorosis [**21**, p. 528; **35**, p. 529]. The best results were obtained with Berlandieri × Riparia 8 B (Wädenswil selection) and (in dry regions) with 5 C (Wädenswil clone). Blue Burgundy also did well on 41 B, while 5 BB was the most suitable of all the stocks tested for Riesling × Sylvaner.

Gold (A. H.), Scott (H. A.), & McKinney (H. H.). **Electron microscopy of several viruses occurring in Wheat and other monocots.**—*Plant Dis. Reptr*, **41**, 4, pp. 250–253, 1957.

At the University of California, Berkeley, it was confirmed that electron-microscope examination of the morphology and size of rod-shaped plant viruses helps to determine their relationship [cf. **26**, pp. 183, 268]. The particle length in each of the three groups of virus strains studied showed a distinct mode, soil-borne wheat mosaic being a straight rod, while *Agropyron* mosaic [cf. **33**, p. 285] and *Nothoscordum* mosaic [**30**, p. 122] were flexuous rods. Each strain, however, was indistinguishable from closely related strains.

O'Konski (C. T.) & Haltner (A. J.). **Characterization of the monomer and dimer of Tobacco mosaic virus by transient electric birefringence.**—*J. Amer. chem. Soc.*, **78**, pp. 3604–3610, 2 diag., 4 graphs, 1956.

At the Dept. of Chemistry and Chemical Engineering, University of California,

Berkeley, transient electric birefringence measurements of a number of dilute aqueous preparations of tobacco mosaic virus [**36**, p. 280] established that the rotational diffusion constant of the monomer unit was 333 sec.$^{-1}$, corresponding to a length of 3416±50A, which is significantly greater than that obtained by electron microscope studies [**31**, p. 212] but in agreement with a molecular weight of 50×10^6 [loc. cit.].

PANZER (J. D.). **Osmotic pressure and plant virus local lesions.**—*Phytopathology*, **47**, 6, pp. 337–341, 3 graphs, 1957.

These results have already been noticed [**36**, p. 866].

SILBERSCHMIDT (K. M.). **Cross-protection- ('Premunity') tests with two strains of Potato virus Y in Tomatoes.**—*Turrialba*, 7, 1–2, pp. 34–43, 6 fig., 1957. [26 refs. Spanish summary.]

Cross-protection tests at the Plant Physiology Section, Instituto Biológico, São Paulo, Brazil, using tomato seedlings and 2 strains of potato virus Y [**37**, p. 114] showed that inoculation with the 'Instituto de Beauvais' strain sometimes delayed and attenuated, but did not prevent, the appearance of the symptoms in the same plant subsequently inoculated with the 'Piedale' strain, irrespective of the external conditions, the time interval between inoculations, and the method of inoculation.

The literature on cross-protection between strains of potato virus Y is discussed and the negative results, particularly in the case of tobacco plants, obtained by earlier authors are indicated. A warning is given against the uncritical use of results of the cross-protection tests for the purpose of virus classification.

MILIČIĆ (D.). **Virus-Zelleinschlüsse in Alliaria officinalis.** [Virus cell inclusions in *Alliaria officinalis*.]—*Protoplasma*, **47**, 3–4, pp. 341–346, 3 fig., 1956.

During 1955, 30–40% of the *A. officinalis* plants growing by the wayside near Zagreb, Yugoslavia, showed well-marked mosaic symptoms. Their cells contained different virus-like elements, mostly X-bodies with crystalline protein needles embedded in them [cf. **35**, p. 746]. Amorphous X-bodies or protein spindles occurred more rarely, while rod-shaped and filiform protein bodies were detected in a few cells. All the inclusions were localized either in the leaf epidermis and mesophyll or in the epidermis of the ovary.

BRADLEY (R. H. E.) & GANONG (R. Y.). **Three more viruses borne at the stylet tips of the aphid Myzus persicae (Sulz.).**—*Canad. J. Microbiol.*, **3**, 4, pp. 669–670, 1957.

Evidence is presented from further studies at the Field Crop Insect Section, Entomology Laboratory, Fredericton, New Brunswick, that cucumber mosaic virus, henbane mosaic virus, and tobacco severe etch virus [tobacco etch virus (str.)] are borne at the apical 15 μ of the stylet of the vector *Myzus persicae* [cf. **35**, p. 785].

Plant protection conference 1956. Proceedings of the second international conference at Fernhurst Research Station, England.—315 pp., 9 pl., 10 fig., 9 diag., 9 graphs, London, Butterworth's Scientific Publications, 1957. 50*s*.

At this conference held at the Fernhurst Research Station of Plant Protection Ltd., Haslemere, Surrey [cf. **31**, p. 447], 18–22 June 1956, delegates from 42 countries attended. The sessions included the following papers, which are accompanied by lists of references and the ensuing discussions.

J. G. KNOLL, F.A.O., in a paper on 'World aspects of plant protection' (pp.

3–12), outlined the history of international co-operation in plant protection, with details of current activities and reference to some major diseases and pests of world concern. W. F. Hanna, Department of Agriculture, Ottawa, discussed 'Genetics in relation to crop protection' (pp. 31–41), outlining the problems involved in the production of resistant varieties, including those arising from variability in pathogens and pests, with particular reference to the breeding of rust resistant wheat. K. T. Suchorukov, U.S.S.R. Academy of Sciences, spoke on 'The physiology of immunity of some agricultural plants' (pp. 42–52), using, amongst others, some diseases of cotton, cereals, and potatoes to illustrate his theme, and concluding that a study of the deviations from the normal caused by infection allowed of a fuller understanding of the physiological processes of the healthy plant. R. L. Knight, East Malling Research Station, outlined the problem of 'Blackarm disease of cotton and its control' (pp. 53–59) [**33**, p. 537 *et passim*].

'The mechanism of toxicity with special reference to fungicides' (pp. 77–95) was dealt with by S. E. A. McCallan, Boyce Thompson Institute, New York, with reference to the fungicides incorporating sulphur, copper and mercury, the phenols, quinones, heterocyclic nitrogen compounds, and 8-quinolinols, and chelation, and concluding with a general discussion of the uptake of fungicides by spores. J. T. Martin, Long Ashton Research Station, spoke on 'The mechanism of toxicity of insecticides and fungicides' (pp. 104–112), including the effect of toxicants upon enzyme systems, the uptake of toxicants, and field problems, with consideration of the characteristics of deposits, methods of investigation, and some general conclusions.

P. W. Brian, I.C.I. Akers Research Laboratories, discussing 'Systemic fungicides and bactericides' (pp. 143–147), outlined some of the general principles involved, and R. Fabre & R. Truhaut, University of Paris, considered 'The problem of residues from pesticides in foodstuffs from the point of view of health' (pp. 186–214), with some references to fungicides.

Discussing 'The mechanics of producing sprays of different characteristics' (pp. 237–277), R. P. Fraser, Imperial College of Science and Technology, London, in a well illustrated paper covered the atomizer requirements for crop protection, methods of atomization, the mechanism of disintegration of liquid sheets, and drop size in sprays from atomizers, concluding with indications of further necessary research. E. W. B. Van Den Muijzenburg, Wageningen, Netherlands, described 'Mistblowing and mistblowers' (pp. 278–282) with operational data, and the conference concluded with a demonstration of spraying and dusting machinery.

Symposium on Foreign Plant Quarantines and Regulatory Administration at the 48th Annual Meeting of the American Phytopathological Society at Cincinnati, Ohio. —*Phytopathology*, **47**, 7, pp. 381–389, 1957.

In a paper on 'Redefinition of the principles of plant quarantine and their relation to the current problems' (pp. 381–382) F. A. Soraci restated the principles underlying quarantine practices. Discussing 'Some broad aspects of federal crops regulatory work' (pp. 382–384) M. R. Clarkson outlined federal responsibilities with regard to plant disease, and the need for prevention of inter-State spread of diseases, correlation of relevant information, and co-operation with other countries. 'What the amendment to the Insect Pest Act of 1905 implies in relation to the layman and to the scientist' was analysed by H. S. Dean (pp. 384–386), setting out the main legislation under which plant quarantine functions [cf. **25**, p. 320] and the sections of the new Federal Plant Pest Act which was approved as Public Law 85–36 on 23 May 1957.

Dealing with 'The movement of plant pathogens' W. H. Wheeler described early measures to check the entry of cultures of potentially dangerous organisms

and the present procedure governing such importations. A. J. RIKER presented a paper on 'The discovery of important diseases before they move from one country to another' and outlined the steps that can be taken to obtain foreknowledge of diseases of introduced plants and the reaction of indigenous plants to pathogens in other countries.

GRAM (E.). **Ursprungsfragen im internationalen Pflanzenverkehr.** [Fundamental questions in international plant traffic.]—*Z. PflKrankh.*, **64**, 7–10, pp. 396–401, 1957. [English summary.]

In connexion with the work of the European Plant Protection Organization [**35**, p. 224 *et passim*] the author discusses some problems incidental to the exclusion of pathogens from uninfested territory. It is pointed out that even a temporary respite from invasion may be of great importance to plant-breeders, plant-protection specialists, and agricultural planners. Simplification and codification of the regulations governing out-port inspection are considered to be urgently called for, and a plea is made for an international exchange of views on these complex matters through Government organizations.

BRIEN (R. M.) & DINGLEY (JOAN M.). **Third supplement to 'A revised list of plant diseases recorded in New Zealand', 1955–1957.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 7, pp. 777–781, 1957.

Included among the 77 fungal, bacterial, virus, and physiological diseases on 97 hosts in this supplement [cf. **35**, p. 236; **36**, p. 426] are: *Corticium salmonicolor* [map 122] on apple; *Cercospora ceanothi* on *Ceanothus* sp.; *Pellicularia filamentosa* [*Corticium solani*] on carnation [cf. **35**, p. 847]; *Albugo candida* on cabbage; citrus psorosis virus; *Stereum purpureum* [**36**, p. 555] on *Cotoneaster* sp., *Crataegus oxyacantha*, *Cupressus macrocarpa*, and *Ulex europaeus*; *Corynebacterium poinsettiae* on *Euphorbia pulcherrima*; *Sclerotinia sclerotiorum* on *Gypsophila paniculata*; *Septoria lactucae*, *Erwinia carotovora*, *Pseudomonas marginalis* [cf. **34**, p. 340], and cucumber mosaic virus on lettuce; *Diaporthe phaseolorum* on tomato; *Ascochyta imperfecta* on lucerne [map 263]; *Phytophthora cinnamomi* on pine [map 302]; *Leptosphaeria coniothyrium* and *Leptothyrium pomi* on apple; *Guignardia rhodorae* and *Pycnostysanus azaleae* on *Rhododendron*; *Kabatiella caulivora* and *Uromyces trifolii* on clover; and *Nigrospora oryzae* on maize.

Administration Report of the Director of Agriculture Trinidad and Tobago for the year 1955.—xi+74 pp., 1957.

It is reported [**35**, p. 357] that severe spotting of grapefruit in Cunupia was attributable to *Diaporthe citri*. Seedling lime disease does not appear to affect trees budded on rootstocks other than lime. Perithecia of *Mycosphaerella musicola* on banana [**35**, p. 621] were first found in Trinidad in 1955, but it is probable that the perfect state has existed there for some time.

BRIANT (A. K.). **Annual Report of the Department of Agriculture, Zanzibar Protectorate, 1956.**—33 pp., 1957.

It is reported [cf. **35**, p. 880] that in preliminary spraying experiments against lime wither tip [*Gloeosporium limetticola*] perenox gave some control. In Kizimbani some lime seedlings were markedly resistant to the disease.

Good progress has been made in the control of clove diseases. Young trees replanted in areas previously affected by 'sudden death' [*Valsa eugeniae*: **35**, p. 164] are growing well. Against die-back [*Cryptosporella eugeniae*: loc. cit.] 5,409 trees on Government land were treated at an average cost per tree of only Shs. 1.98.

Outbreaks and new records.—*F.A.O. Pl. Prot. Bull.*, **5**, 10, p. 161, 1957.

Reporting from Cuba, V. Lasaga states that Japanese experts have confirmed that white stripe disease of rice [**36**, p. 552] is due to a virus resembling that causing stripe in Japan and tentatively considered to be a strain of the rice stripe virus [**36**, p. 496].

The Caribbean Commission report that the presence of leaf scald (*Xanthomonas albilineans*) [map 33: cf. **36**, p. 174] on sugarcane in Martinique has been confirmed.

Plant pest handbook.—*Bull. Conn. agric. Exp. Sta.* 600, v+194 pp., 151 fig., 1956. [Received 1957.]

This is a revision of a handbook first published in 1934 [**13**, p. 457].

Stakman (E. C.) & Harrar (J. G.). **Principles of plant pathology.**—xi+581 pp., 124 fig., New York, Ronald Press Co., 1957. $8.00.

This important and well-produced book deals with general aspects of plant diseases, especially those caused by fungi. The 18 chapters include accounts of the importance, classification, and causes of plant diseases; the nature, classification, growth, reproduction, genetics, and dissemination of plant pathogens; the effect of environment and nutrition on disease development; plant quarantine; and the control of plant diseases by cultural practices, chemical methods, and the use of resistant varieties. Each section concludes with a list of selected references, mostly in English, while a 4-page appendix lists important general books on plant pathology. There are also author and subject indexes, and an alphabetical list of the principal fungal and bacterial pathogens mentioned in the text.

Ciferri (R.). **G. Lindau & P. Sydow, Thesaurus literaturae mycologicae et lichenologicae. Supplementum 1911–1930.**—A–D, iv+689 pp., Pavia, Renzo Cortina, 1957. Lire 20,000 (for the complete work).

This first instalment of what will clearly be a most valuable supplement is on the same lines as the *Thesaurus* and includes 7,167 citations of books and journal articles on both systematic and applied aspects of mycology arranged alphabetically under authors. This supplement is essential for all who possess the original *Thesaurus* or the 4-volume reprint (available from the Johnson Reprint Corporation, New York), but it can also, as the publishers claim, find useful employment as an independent work. [Completion of the supplement during 1958 is promised by the issue of 2 or 3 more volumes.]

Lioret (C.). **Sur le métabolisme de l'acide glutamique dans les tissus de crown-gall de Scorsonères cultivés in vitro.** [On the metabolism of glutamic acid in the crown gall tissues of *Scorzonera* cultured *in vitro*.]—*C.R. Acad. Sci., Paris*, **245**, 16, pp. 1329–1331, 1957.

It is concluded from experiments on the nutrition of *Scorzonera* [*hispanica*] tissues infected by crown gall [*Agrobacterium tumefaciens*] with C^{14}-labelled compounds that tricarboxylic acids originate principally from a carboxylation of α-keto-glutaric acid.

Echandi (E.), Van Gundy (S. D.), & Walker (J. C.). **Pectolytic enzymes secreted by soft-rot bacteria.**—*Phytopathology*, **47**, 9, pp. 549–552, 1 graph, 1957.

A study of *Erwinia carotovora*, *E. atroseptica*, and *E. aroideae* [cf. **35**, p. 593] at the University of Wisconsin, Madison, showed that on synthetic media containing pectin these bacteria produced no pectin methyl esterase or polygalacturonase, but an abundance of depolymerase [cf. **36**, pp. 68, 659]. The enzymes of *E. carotovora* and *E. atroseptica* macerated tissues most actively at pH 6·5, that of *E. aroideae* at 8·9. Heating for 10 min. at progressively higher temperatures up to

65° C. reduced the enzyme activity of all 3 spp., but there was still slight activity after boiling. Enzyme production by *E. aroideae* and *E. carotovora* was at a maximum in media at pH 7·9, and the enzymes proved more active on pectate than on partially demethylated pectin substrate.

Crop protection products approval scheme. Approved list 1957.—52 pp., London, Ministry of Agriculture, Fisheries and Food, 1957.

The 14th edition of this list [cf. **35**, p. 912] replaces the issue of Jan. 1956. Approved fungicides and insecticides are covered (pp. 5–22), manufacturers are listed (pp. 26–28), and there is a comprehensive index, including crops, pathogens, and chemicals (pp. 28–52).

Fratini (Nicola) & Serra (Maria). **Osservazioni e ricerche sulle poltiglie Bordolesi alcaline.** [Observations and researches on alkaline Bordeaux mixtures.] —*Ann. Chim. Roma*, **46**, pp. 1030–1036, 3 graphs, 1957.

An account is given of experimental work conducted at the Institute of Applied and Industrial Chemistry, University of Rome, Italy, to determine the chemical constitution of alkaline Bordeaux mixtures.

Howard (F. L.) & Cormier (Barbara C.). **Halogen-aceto compounds as fungicides.** —Abs. in *Phytopathology*, **47**, 9, p. 525, 1957.

Study of the chemical group comprising the iodoaceto, chloroaceto, and bromoaceto moiety in such compounds as 1,4-bis-bromoacetoxy-2-butene, butane-1-4-diol bromoacetate, and 2-bromoacetoxyethyl chloride indicated 25 potential non-metallic fungicides. The second named was not phytotoxic to tomato foliage at 2,000 p.p.m., but the other compounds tested were so at 500 p.p.m. or higher.

Daines (R. H.), Lukens (R. J.), Brennan (E.), & Leone (A.). **Phytotoxicity of captan as influenced by formulation, environment, and plant factors.**—*Phytopathology*, **47**, 9, pp. 567–572, 5 graphs, 1957.

At New Jersey Agricultural Experiment Station, New Brunswick, phytotoxicity of captan (on *Phaseolus vulgaris* as a test plant) was shown to increase with stronger formulations of the fungicide, use with diluents inciting greater damage than captan alone, kaolinite causing more (av. 52·01% compared with 9·43% for 0·25–8% captan) than attapulgite or talc. Increase in the concentration of wetting agents also enhanced phytotoxicity, as did spraying under any conditions that favoured stomatal penetration by the fungicide. Calcium carbonate and magnesium oxide had a 'safening' effect.

Captan toxicity increased with rise in temperature especially at 85°–100° F., and with decrease in light intensity. A dry deposit was as harmful or more so than a wet. Studies *in vitro* showed that with increased temperature and time captan decomposition is augmented, with a resulting increase in hydrogen ion and chloride concentration and accumulation of hydrogen sulphide, the acidity probably being to some extent responsible for the phytotoxicity. It was also shown that amino compounds containing sulphydryl groups cause rapid decomposition of the fungicide, and some such action may take place within the cells if stomatal penetration occurs.

Martin (J. T.). **Studies on the natural protective covering of plants : I. Plant wax in relation to resistance to infection by fungi.**—*Rep. agric. hort. Res. Sta. Bristol, 1956*, pp. 94–100, [1957].

After discussing in general the wax covering of plants and the chemical basis of resistance to disease the author describes how the waxy surface layers of apple leaves and fruits were removed by ether and separated into acidic, volatile, wax,

and oil components, which were then examined for their ability to inhibit the germination of spores of *Botrytis fabae* and *Sclerotinia* [*Monilinia*] *fructigena*, observed on cavity slides, and *Podosphaera leucotricha* inoculated on to leaves previously sprayed with an ether solution of the fraction in question and recovered for examination [35, p. 909].

The most striking finding was the high content of acidic material in the waxy surfaces. The acid fractions of Worcester and Cox leaves were shown by chromatographic tests to have properties similar to those of the antifungal compound of Spencer *et al.* [36, p. 456], and to consist essentially of a phenolic compound, with lesser amounts of an acidic, non-phenolic substance. Some of the other fractions also possessed fungistatic properties. [These results are summarized by Martin (J. T.), Batt (R. F.), & Burchill (R. T.), *Nature, Lond.*, **180**, 4590, pp. 796–797, 1957.]

Martin (J. T.) & Somers (E.). **Solubilization of copper by leaves and water-soluble acids from leaf wax.**—*Nature, Lond.*, **180**, 4590, pp. 797–798, 1957.

In further studies at Long Ashton Research Station [see above], areas of 10–20 sq. cm. of healthy, uninjured leaves were sprayed with 10:12·5:100 Bordeaux or 10:11·4:100 Burgundy mixture, dried, immersed in water, and the amount of copper dissolved from the deposit by the leaves determined. The solution from leaves of Cox's Orange Pippin apple sprayed with Bordeaux contained 7·9 p.p.m. dissolved copper, from Worcester Pearmain 6·9 p.p.m., and from potato 1·9 p.p.m., 0·12–0·14 p.p.m. being dissolved from deposits on glass. In other tests the water-soluble acids from Cox leaf wax dissolved 3·8–5·5 p.p.m. copper from a Burgundy deposit and 2·8–10·5 from Worcester leaf wax. Since the toxic effect of these mixtures depends on the liberation of copper in solution it is concluded that the host plant brings about this solubilization by means of acidic material associated with its leaf wax.

Somers (E.) & Richmond (D. V.). **Sorption of copper from Burgundy mixture by leaves.**—*Nature, Lond.*, **180**, 4590, pp. 798–799, 1 fig., 1957.

In this further contribution from Long Ashton Research Station [see above] 5 µl. droplets of Burgundy mixture, containing 0·25 or 1·25% copper, were placed on the under surface of broad bean leaves, which were dried and washed in 2N HCl for 0·5, 1, or 2 min. or 0·1N HCl for 1, 2, or 5 min. The copper remaining on the leaf averaged 0·03 µg. per droplet and did not depend on the time (up to 5 weeks) which the deposit had remained or on the concentration of the spray. With spores of *Botrytis fabae* it was shown that the copper sorbed from the spray deposit by the leaf was fungicidally inactive. The results suggest that the copper is adsorbed on the surface rather than absorbed into the leaf while the deposit is drying.

Besemer (A. F. H.). **Faktoren die van invloed zijn op het ontstaan von 'spuitbeschadigingen'.** [Factors which influence the development of 'spray injuries'.]—*Meded. LandbHoogesch. Gent*, **21**, 3, pp. 483–496, 6 fig., 1956. [English summary. Received Oct. 1957.]

Varietal susceptibility, soil conditions, and mineral deficiencies are among the factors discussed and illustrated by actual examples in relation to the damage inflicted on fruit trees in the Netherlands by chemical sprays. Such injury is particularly liable to occur during a period of vigorous growth, e.g., for about a month immediately after blossom. In practice the use of combined fungicidal and insecticidal sprays tends to enhance the risk of adverse effects due, for instance, to a superfluity of wetter, resulting in irregular distribution of active ingredients and, with low-volume spraying, coalescence of the concentrated droplets. Most fungicides are soluble in the organic solvents present in liquid insecticidal formula-

tions and in this state they readily penetrate and injure the foliage. Of recent years liquid formulations of parathion and other phosphorus esters have induced symptoms on outdoor and glasshouse crops which are strongly reminiscent of those associated with herbicides based on hormones.

Shapiro (S.). **Standard reference fabrics for soil burial and weathering tests.**—*Text Res. J.*, **27**, 9, p. 753, 1957.

At a meeting of the National Academy of Sciences in Washington, D.C., it was proposed that 2 standard fabrics should be used for all laboratory assays of fungicides by means of soil burial, weathering, and other tests, viz., (1) an untreated cotton duck, made to exacting specifications to ensure uniformity, and (2) the same material treated with an acceptable fungicide as a treated control standard.

The preparation of uniform 1-in. ravelled specimens from these fabrics would be facilitated by the use of coloured warp yarns so placed as to outline exactly 1 in. of the warp and to yield replicable 1-in. samples on ravelling. The use of these fabrics would furnish means of *(a)* determining the change in activity of a given soil bed between one test period and another, *(b)* comparing directly the efficiency of fungicides tested at different times, *(c)* comparing the activity of soil beds used by different pathogenic agents, *(d)* determining the severity of different weathering, and *(e)* taking into account shrinkage or expansion during treatment. The number of threads bounded by the two-coloured yarns would always be constant.

The cost of these fabrics would only slightly exceed that of ordinary material of the same weight. It is planned to have woven and treated at one time the estimated requirements of co-operating laboratories for a 3-year period.

Hine (R. B.) & Butler (E. E.). **Use of novobiocin for isolation of fungi from the soil.**—Abs. in *Phytopathology*, **47**, 9, p. 524, 1957.

The antibiotic novobiocin at 100 p.p.m. proved very effective in inhibiting growth of soil bacteria in potato-dextrose agar and enabling the assay of fungi present. Only some species of *Pythium* and *Phytophthora* were completely suppressed.

Ikeda (Y.), Ishitani (C.), & Nakamura (K.). **A high frequency of heterozygous diploids and somatic recombination induced in imperfect fungi by ultra-violet light.**—*J. gen. appl. Microbiol.*, **3**, 1, pp. 1–11, 1 diag., 4 graphs, 1957.

Experiments at the Institute of Applied Microbiology, University of Tokyo, are described whereby the frequency of diploidization in *Aspergillus oryzae* was sufficiently increased by irradiating heterocaryotic conidia with ultra-violet light to enable application of the method for breeding purposes [cf. **34**, p. 166 and see below].

Ikeda (Y.), Nakamura (K.), Uchida (K.), & Ishitani (C.). **Two attempts upon improving an industrial strain of Aspergillus oryzae through somatic recombination and polyploidization.**—*J. gen. appl. Microbiol.*, **3**, 2, pp. 93–101, 2 pl. (1 col.), 1957.

In further studies [see above] a diploid strain of *A. oryzae*, obtained by somatic recombination, produced 40% more kojic acid than the parent yellow lysineless strain. The protease activity of 2 diploid and 1 tetraploid strains was higher than any of the haploid ones.

Ziffer (J.), Ishiara (S. J.), Cairney (T. J.), & Chow (A. W.). **Phytoactin and phytostreptin, two new antibiotics for plant disease control.**—Abs. in *Phytopathology*, **47**, 9, p. 539, 1957.

Two polypeptide antibiotics which were isolated from culture filtrates of an undescribed species of *Streptomyces* and proved active against fungi and Gram+ bacteria are briefly described.

NAITO (N.) & TANI (T.). **Antibiotic production by Gloeosporium olivarum cultured on media containing 2,4-D.**—*Forsch. PflKr., Kyoto*, **5**, 4, pp. 127–138, 3 fig., 1956.

This work has already been noticed [**36**, p. 486].

COOKE (W. B.) & KABLER (P. W.). **Plant disease fungi in sewage polluted water.**—*Publ. Hlth Rep., Wash.*, **72**, 7, pp. 651–654, 1957.

The possibility that the spores of plant-pathogenic fungi may be disseminated by sewage effluent, which is now being increasingly used as an irrigation supplement in the United States, is discussed in relation to the recovery of such organisms from a treatment plant at Dayton, Ohio [cf. **36**, p. 658]. Among the species isolated in the course of routine studies were *Alternaria tenuis, Aspergillus niger, Botrytis cinerea, Cephalosporium* spp., *Chaetomium funicola, C. globosum, Cladosporium cladosporioides, Coniothyrium fuckelii* [*Leptosphaeria coniothyrium*], *Curvularia lunata, Epicoccum nigrum, Fusarium moniliforme* [*Gibberella fujikuroi*], various forms of *F. oxysporum* and *F. solani, Penicillium digitatum, P. expansum, P. italicum, P. oxalicum,* and *Trichoderma viride.*

KOCH (J.). **Mykorrhizernes betydning for skovtræernes ernæring belyst ved radioaktive isotoper.** [The importance of mycorrhiza in the nutrition of forest trees elucidated by radioactive isotopes.]—*Dansk Skovforen. Tidsskr.*, **42**, 6, pp. 310–315, 1 diag., 1957.

This is a concise explanation of the principles underlying the experimental techniques used by Melin and Nilsson in their recent studies on mycorrhiza [**33**, p. 747; **35**, p. 86].

BUDDENHAGEN (I. W.). **Ultraviolet and X-ray-induced mutations in Phytophthora cactorum.**—Abs. in *Phytopathology*, **47**, 9, p. 517, 1957.

By irradiating zoospores of *P. cactorum* morphological [**33**, p. 170], pathological, and physiological mutants were secured.

SIM (S. K.) & YOUNGKEN (H. W.). **Catecholase activity in tissue cultures of Claviceps litoralis.**—*J. Amer. pharm. Ass.*, **45**, 12, pp. 779–784, 6 graphs, 1956. [Received 1957.]

At the College of Pharmacy, University of Washington, Seattle, the catecholase activity of older, more pigmented tissues of *Claviceps litoralis* [**35**, p. 719] was higher than in younger, less pigmented tissues. The maximum activity occurred after 28–35 days' growth, and activity was inhibited by sodium diethyldithiocarbamate and by potassium cyanide.

NAQVI (S. H. Z.) & GOOD (H. M.). **Studies of the ageing of conidia of Monilinia fructicola (Wint.) Honey. 1. Germination rates and longevity.**—*Canad. J. Bot.*, **35**, 5, pp. 635–645, 3 graphs, 1957.

Conidia of *Monilinia* [*Sclerotinia*] *fructicola* were stored for up to 10 months at 5, 25, and 35° C. and at 0, 15, 45, 75, and 90% R.H. before germination was tested on potato dextrose agar at the Dept of Biology, Queen's University, Kingston, Ontario. After 3 months all the samples gave 100% germination but only those at 5° germinated after 10 months. Storage at R.H. 75% gave the best results. Old conidia germinated more slowly than fresh ones; with some stored samples 60 hr. elapsed before 100% germination, while fresh spores began to germinate after 3–4 hr. The presence of glucose stimulated germination, particularly of old spores stored at high humidities, but various amino acids had no such effect.

Ishikawa (T.) & Tanaka (N.). **Effects of temperature on reversion rate of Ustilago maydis.**—*Bot. Mag., Tokyo*, **70**, 828, pp. 183–189, 3 graphs, 1957.

From a study of the relationships between reversion rates of homocysteineless strains of *U. maydis* and activation energy at the Botanical Institute, University of Tokyo, it is postulated that the mutants have a pseudoallelic nature.

Takagi (Y.) & Sakaguchi (K.). **Studies on the conidial colour change in Aspergillus fungi. Part I. Physiological modification of a genetic block between yellow and green colour development.**—*J. gen. appl. Microbiol.*, **3**, 2, pp. 125–136, 1957.

In co-operative studies between the Department of Agricultural Chemistry and the Institute of Applied Microbiology, University of Tokyo, yellow mutants of *Aspergillus sojae* and *A. oryzae* [**37**, p. 75] changed to green in the presence of halogen or copper ions. The effect was reversible on returning the culture to ordinary media.

Menon (S. K.) & Williams (L. E.). **Effect of crop, crop residues, temperature, and moisture on soil fungi.**—*Phytopathology*, **47**, 9, pp. 559–564, 1957.

In greenhouse experiments on Wooster silt loam top soil at Ohio Agricultural Experiment Station, Wooster, it was found that continuous cropping (4 times in 2 years) with lucerne, maize, oats, or wheat influenced the final mycoflora. Lucerne resulted in the highest number of aspergilli (particularly *Aspergillus ochraceus* and *A. ustus* groups), *Fusarium* spp., and *Penicillium rugulosum* series; maize soil had the maximum of penicillia and *P. funiculosum* and *P. purpurogenum* series; oat soil had the most colonies of *Chaetomium* spp., and wheat soil of *Rhizopus* spp. There appeared to be an inverse relationship between colonies of *Fusarium* and *P. funiculosum* series in lucerne and maize soils. Cropping with maize and oats gave a different mycoflora than that of buried residues of these crops. After 2 years' cropping autoclaved soil was recolonized by much the same fungi as are in unautoclaved soil.

The mycoflora of soil moistened daily to field capacity and kept for 5 weeks at 10, 20, or 30° C. did not differ; fluctuating moisture content, from 20–8, 20–14, and 20–18% by weight, induced by watering at different time intervals, did not affect the predominant groups of soil fungi, but the relative frequency of their occurrence differed, the number of colonies of *Botrytis* spp., *P. restrictum* series, and total penicillia decreasing as moisture increased. Soil pH was not a contributory factor to mycofloral change.

The results indicate that the crop plant itself is the decisive factor influencing the nature of soil mycoflora, possibly because of the chemical substances produced by the roots; the influence of seasonal and climatic changes is of little account.

McLennan (Ethel I.) & Ducker (Sophie (C.). **The relative abundance of Mortierella Coemans spp. in acid heath soils.**—*Aust. J. Bot.*, **5**, 1, pp. 36–43, 1957. [11 refs.]

A comparison of the fungi isolated in Victoria, Australia, from 2 podsolized heath soils, one at Frankston, known as Cranbourne sand, with an underlying hardpan (coffee rock), the other at Anglesea, Angahook fine sand, without a hard pan but with underlying heavy clay, showed that the dominant species in the former is *Mortierella ramanniana* [*Mucor ramannianus*: cf. **34**, p. 180], while in the latter it is *Mortierella nana*. At Frankston the density of *Mucor ramannianus* ranged from 79 to 89% in the A and B horizons, while at Anglesea it was not found in the dilution plates, though the density of *Mortierella nana* was 50·5% and the frequency 87·5%. Parallel observations have been made in England [**33**, p. 369] and it is concluded that the dominance of one or other of these two species is not a local effect but indicates the presence of certain soil types.

Jenkins (Anna E.), Bitancourt (A. A.), & Goidànich (G.). **Estudos sôbre as Miriangiales. IX. Elsinoe sôbre Carvalho (Quercus spp.).** [Studies on the Myriangiales. IX. *Elsinoe* on Oak (*Quercus* spp.).]—*Arq. Inst. biol., S. Paulo*, **23**, pp. 117–123, 2 pl., 1956. [English summary. Received Oct. 1957.]

This is a taxonomic study of the fungi on oak leaf material (2 specimens of *Quercus ilex* and 1 of *Q. rubra* from Italy, 1 of *Q. nigra* from Florida, and 1 each of *Q. serrata* and *Q. amaniana* from Japan) infected by *Elsinoe.*

One specimen on *Q. ilex* was identified as *Uleomyces querci-ilicis,* here transferred to *Elsinoe* as *E. quercus-ilicis* (Arn.) Jenkins & Goidànich. Both in Italy and France the fungus was closely associated with *Cycloconium querci-ilicis.*

The new species *E. quercicola* Bitancourt & Jenkins produces on both surfaces of *Q. nigra* leaves circular or irregular spots, 0·5–1 mm. diam., scattered or coalescent along the veins, with a dirty white centre and narrow brown or dark brown margin. Its perithecia measure $80–150 \times 40–70\,\mu$ and the globose asci, $15–20\,\mu$ diam., contain up to 8 2- to 3-septate ascospores, $12–14 \times 6\,\mu$.

The spots on the remaining specimens listed above were similar to those caused by *E. quercicola* but in the absence of perithecia they are both referred to *Sphaceloma* sp.

Luttrell (E. S.). **Helminthosporium nodulosum and related species.**—*Phytopathology*, **47**, 9, pp. 540–548, 14 fig., 1957.

The results are given of a study at Georgia Experiment Station of *H. nodulosum* and of the related species *H. leucostylum, H. kusanoi,* and *H. hadrotrichoides. H. nodulosum* was studied on *Eleusine indica,* which it infects systemically, causing seedling blight, leaf stripe, and sooty heads. Perithecia, obtained by culture of *H. nodulosum* on barley straw and grains and maize grains, are described as belonging to a new species, *Cochliobolus nodulosus.* They were $276–414\,\mu$ diam., containing asci $120–193 \times 14–16·8\,\mu$ with 3- to 11-septate ascospores. The taxonomy of the 4 *H.* spp., which form a group distinguished by the relatively small conidia and typical conidiophores, is discussed in detail. *H. nodulosum* and *H. leucostylum* are regarded as one species and a key to this and the other two (which parasitize *Eragrostis* spp.) is provided. It is considered that *H. nodulosum* var. *tritici,* described from India [**33**, p. 596], is in fact *H. halodes* (probably = *H. rostratum*) [**26**, p. 337].

Dias (Maria R. de S.). **Fungi Lusitaniae XV.** [Fungi of Portugal XV.]—*Agron. lusit.*, **18**, 4, pp. 237–243, 2 fig., 1956. [Received November, 1957.]

Included in this further instalment of the current series [**36**, p. 128] are 2 new species, 3 other species new to the country, and *Colletotrichum gloeosporioides* [*Glomerella cingulata*] together with *Epicoccum vulgare* on orange.

Lucas (Maria T.). **Fungi Lusitaniae XVI.** [Fungi of Portugal XVI.]—*Agron. lusit.*, **19**, 1, pp. 23–29, 1 fig., 1957.

Among the items in the present list [see above] are a new species, a new form, 8 new records for Portugal including *Pollaccia radiosa* [**19**, p. 51; **31**, p. 91] on poplar, and *Peronospora schachtii* [map 28] and *Cercospora beticola* [map 96] on beet.

Grover (R. K.). **Foliicolous fungi of Saugar.**—*Bull. bot. Soc. Univ. Saugar* 1 & 2, pp. 9–13, 1951–52, 1953. [Received 1957. Mimeographed.]

This list of 58 foliicolous fungi of Saugar [Mysore, India] and its surroundings is based on material collected during 1950–52. The following may be noted: *Albugo candida* on cabbage, *Erysiphe polygoni* on peas and beans, *Uromyces striatus* on lucerne [map 342], *Melampsora lini* on flax [**34**, p. 596], *Cercospora personata*

[*Mycosphaerella berkeleyii*] on groundnut, and *Helminthosporium gramineum* on wheat.

Symposium on the maintenance of cultures of microorganisms.—*Bact. Rev.*, **19**, 4, pp. 280–283, 1955.

In the course of this symposium at the 55th general meeting of the Society of American Bacteriologists W. C. Haynes summarized his experiences in maintaining industrially important micro-organisms. Helen R. Skeggs stressed the importance of maintaining organisms in a vigorous state for the determination of vitamin and growth factors, while conceding that there are as yet no hard-and-fast principles as to how this should be done. A. C. Blackwood considered problems arising from freeze-drying as a method of preserving fungi. Certain fungi need special treatment for successful freeze-drying, the most critical factor being the choice of the suspending vehicle; inclusion of sugar has given the best results. More work is needed to determine the best techniques for various moulds; those which produce small spores are amenable to the method, but there are as yet no techniques for handling those which sporulate rarely or not at all.

Held (V. M.) & Walker (R. L.). **The use of uncoated cellophane in ultraviolet irradiation.**—*Phytopathology*, **47**, 9, p. 573, 1 graph, 1957.

A method of using uncoated cellophane to cover beakers in which cultures are subsequently exposed to ultra-violet light is described from Chemical Corps, Fort Detrick, Frederick, Maryland.

McCallan (S. E. A.). **Determination of individual fungus spore volumes and their size distribution.**—Abs. in *Phytopathology*, **47**, 9, p. 528, 1957.

Mean spore volumes for 20 species of fungi are listed, with some notes on size distribution. The spore volume ranged from 15,600 cu. μ for *Uromyces caryophyllinus* [*U. dianthi*] to 5·06 cu. μ for *Cephalosporium acremonium.*

Pady (S. M.). **A new slit-type continuous spore sampler.**—Abs. in *Phytopathology*, **47**, 9, p. 531, 1957.

A sampler (especially suited to rusts) is described [cf. **36**, p. 775], which is designed to take hour-long samples continuously over 24 hr., depositing the spores in 24 bands on a slide.

Bawden (F. C.) & Pirie (N. W.). **The activity of fragmented and reassembled Tobacco mosaic virus.**—*J. gen. Microbiol.*, **17**, 1, pp. 80–95, 1957. [35 refs.]

Studies at Rothamsted Experimental Station of the products obtained when tobacco mosaic virus is disrupted with alkali or phenol suggest that immunological specificity is primarily an attribute of the protein and infectivity of the nucleic acid fractions. The possibility that infective tobacco mosaic virus can be reassembled *in vitro* from previously non-infective components cannot be excluded, but all the results that suggest this can also be interpreted in other ways.

Yarwood (C. E.). **Heat tolerance of virus-infected and fungus-infested tissues.**—Abs. in *Phytopathology*, **47**, 9, pp. 538–539, 1957.

When bean [*Phaseolus vulgaris*] leaves infected with tobacco mosaic, tobacco ring spot, or peach yellow bud mosaic virus were heated at dawn for 24–40 sec. at 50° C. in water, 2–3 days after inoculation, only the non-infected areas suffered severely and were killed, infected areas still appearing green 2 days later. If the treatment was applied in the afternoon no such distinction occurred. Bean leaves lightly infected by uredia of *Uromyces phaseoli* [*U. appendiculatus*] reacted similarly to like treatment, the rust fungus and healthy tissue being killed by dawn heating,

the pustules and areas [immediately] beyond the mycelium remaining green. These results are thought to indicate heat protection due to abnormally high accumulation of carbohydrate around the lesions.

Silva (D. M.). **Estudos serológicos com dois virus de planta.** [Serological studies with two plant viruses.]—*Rev. agric., Piracicaba*, **32**, 3, pp. 189–194, 1957. [English summary.]

From the results of preliminary studies at the Instituto Agronômico, Campinas, São Paulo, Brazil, using the precipitin test, it appears that a virus responsible for mosaic in *Chenopodium murale* in Rio Grande do Sul contains antigenic groups similar to those of tobacco mosaic virus. Further observations indicated, however, that the serum was bivalent, giving simultaneous reactions to both viruses, the latter being the contaminator.

Injected into guinea-pigs, the 'Riverside' strain of the *C. murale* virus induced the formation of antibodies. A serological relationship between the 'Riverside' and Rio Grande do Sul strains is deduced from the reaction to absorption of the antiserum with the aucuba strain of tobacco mosaic virus. The resultant serum was bivalent, reacting to both viruses.

Reiter (Liselotte). **Vitale Fluorochromierung pflanzlicher Viruseinschlußkörper.** [Vital fluorochromation of plant virus inclusion bodies.]—*Protoplasma*, **48**, 2, pp. 279–286, 2 fig., 1957.

It is reported from the Pflanzenphysiologisches Institut der Universität, Graz, Austria, that the protoplasmic X-bodies in the epidermal cells of virus-infected *Aichryson* [*Sempervivum*]×*domesticum* f. *foliis variegatis* [**35**, p. 747] are clearly discernible by the fluorescence microscope with the aid of vital fluorochromes, e.g., potassium fluorescein, eosin, pyronine, coriphosphine, neutral red, primuline, auramine, and acridine orange.

Maramorosch (K.). **Reversal of virus-caused stunting in plants by gibberellic acid.** —*Science*, **126**, 3275, pp. 651–652, 3 fig., 1957.

At the Rockefeller Institute for Medical Research, New York, County Gentleman sweet corn seedlings infected by the Mesa Central strain of maize stunt virus [**35**, p. 602], China aster by the eastern strain of aster yellows virus, and crimson clover (*Trifolium incarnatum*) by wound tumour [clover big vein] virus were sprayed when severely stunted, 6 weeks after inoculation by means of the appropriate insect vector, with a freshly prepared, 100 p.p.m. solution of gibberellic acid [cf. **35**, p. 37] in water, the controls being sprayed with distilled water. The treatment was re-applied twice more at weekly intervals.

The treated plants resumed growth, while the controls remained stunted. The internodes of the treated asters and maize elongated to twice their original length, while the clover petioles increased 3 times in length and became erect. The reversal of stunting became apparent in maize 48 hr. after the first application and in asters and clover after 5 days.

Chinn (S. H. F.) & Ledingham (R. J.). **Studies on the influence of various substances on the germination of Helminthosporium sativum spores in soil.**—*Canad. J. Bot.*, **35**, 5, pp. 697–701, 1957.

Conidia of *H. sativum* [*Cochliobolus sativus*] were stimulated to germinate in soil at the Science Service Laboratory, University of Saskatchewan, Saskatoon, in the presence of natural products including wheat germ, bran, oil meal, molasses, orange juice, and green plant tissues [cf. **33**, p. 474]. Refined flour and commercial sugar were only slightly stimulatory and though in general natural substances favoured germination, there was none with wheat straw or roots. Except for ascorbic

acid, galactose, and raffinose, most of the substances tested in the acid, salt, vitamin, protein, oil, saccharide, plant hormone, and certain other groups were also ineffective.

VEENENBOS (J. A. J.). **Onderzoek naar het voorkomen van roest Puccinia spp., bij granen in 1955.** [Investigation on the occurrence of rust, *Puccinia* spp., on cereals in 1955.]—*Jbje Sticht. Nederl. Graan-centr.*, **1**, pp. 32–37, 1956. [English summary. Received Oct. 1957.]

The exceptionally heavy damage to winter wheat caused by *P. glumarum* in 13 regions of the Netherlands in 1955 [cf. **34**, p. 440] is tentatively attributed to the occurrence of a new physiologic race of great pathogenicity to var. Heines VII, which occupied some 80% of the entire area under the crop. The incidence of *P. triticina* was low and that of *P. graminis* negligible. *P. dispersa* caused slight infection of rye. *P. simplex* [*P. hordei*] and in one locality *P. glumarum* were observed on barley. *P. coronata* was the only rust on oats.

BRIDGMON (G. H.). **The production of new races of Puccinia graminis var. tritici by hyphal fusion on Wheat.**—Abs. in *Phytopathology*, **47**, 9, p. 517, 1957.

Notes are given on new races obtained by hypodermic injection into the boot of wheat plants of uredospores belonging to pairs of colour-marked races of *P. graminis* mixed in aqueous solution [cf. **37**, p. 30].

FITZGERALD (P. J.), CALDWELL (R. M.), & NELSON (O. E.). **Inheritance of resistance to certain races of leaf rust of Wheat.**—*Agron. J.*, **49**, 10, pp. 539–543, 1 fig., 1957.

At the Dept of Botany and Plant Pathology, Purdue University, Lafayette, Indiana, seedling resistance of Purdue 3369–61–1–1–10 wheat (Wabash × American Banner), a promising parent in the breeding programme, and a selection therefrom to races 5, 9, 15, and 76 of *Puccinia rubigo-vera* f. sp. *tritici* [*P. triticina*] was found to be controlled by single dominant genes, and that to race 65 by duplicate recessive genes inherited independently of each other and of the gene for resistance to race 5.

RAFAILĂ (C.). **Dezinfecția și ridicarea rezistenței la boli a Grîului de primăvară pe calea tratării complexe a semințeі.** [Disinfection and increase of disease resistance of spring Wheat by the complex treatment of the seeds.]—*Anal. Inst. Cerc. Agron. Român.*, Ser. 9, **24**, 5(*1956*), pp. 539–548, 1957. [Russian and French summaries.]

Laboratory and field experiments at the Timiryazev Academy, Moscow, U.S.S.R., on the spring wheat var. Moskovka showed that combined treatment with insecticides (hexachloran), fungicides (2 mercury preparations and thiram), and micro-elements (B, Mn, Zn) is possible by either wet or dry methods. The seed was treated with the solutions and suspensions and left for 24–36 hr. before sowing, or the fungicides were applied dry and the insecticides and micro-elements introduced in the soil dry with the seed. This treatment decreased bunt [*Tilletia caries*] considerably, *Puccinia triticina* by up to 55%, reduced insect attack, and increased yield by at least 34%.

PURDY (L. H.) & KENDRICK (E. L.). **Effect of soil temperature on the time of infection of Red Bobs Wheat by Tilletia caries.**—Abs. in *Phytopathology*, **47**, 9, p. 532, 1957.

Wheat seed inoculated with *T. caries* was sown in sand at 5, 10, 15, and 20° C.; seedlings were removed at 24-hr. intervals, washed, and transplanted to greenhouse soil, half being surface sterilized in 1:1000 panogen for 2 min. Maximum bunt (63–100%) developed in plants from seed incubated at 20, 15, and 10° C. for 7, 8, and 10 days, respectively. Only 12–14% occurred after 5° for 20 days.

Veenenbos (J. A. J.) & Brandsma (T. W.). **Onderzoek naar het voorkomen van steenbrand, Tilletia tritici (Bjerk.) Wint. in Wintertarwe.** [Investigation on the occurrence of bunt, *Tilletia tritici* (Bjerk.) Wint. in winter Wheat.]—*Versl. PlZiekt. Dienst Wageningen* 129 (*1955*), pp. 167–171, 1956. [English summary. Received Oct. 1957.]

In field surveys to determine the incidence of bunt (*T. tritici*) [*T. caries*] in the Netherlands in 1954–5, the numbers of infected ears were counted over an area of 4×50 sq. m. in 25 plots in each of 7 regions scattered throughout the country. Laboratory tests involved the microscopic examination of centrifuged spore suspensions from samples collected after threshing in each plot to ascertain the number of spores per 100 seeds. The latter method was adjudged to be the more reliable of the two.

The disease was found to be more prevalent in the south [**31**, p. 479] than in the north, where certified seed is more extensively used. Germisan and ceresan were the principal disinfectants, applied mostly by the farmers themselves in a dry form.

Berend (I.). **A Tilletia foetida klamidospóráinak vitalitását befolyásoló külső tényezők vizsgálata. II. rész. A Tilletia foetida klamidospórák vitalitásának befolyásolása sugárzásokkal.** [The investigation of the external factors influencing the viability of chlamydospores of *Tilletia foetida*. Part II. The influence of radiation on the viability of the chlamydospores.]—*Ann. Inst. Prot. Plant. Hung.*, 7 (*1952–56*), pp. 341–366, 21 fig., 1957. [Russian and German summaries.]

The viability of chlamydospores of *T. foetida* [**34**, p. 29] was shown to decrease with age. When spores of different ages were treated with X-rays, ultra-violet and radioactive rays, or with ultrasonic vibrations, or given deep-freeze treatment, some 10–16-year-old spores which were apparently non-viable regained their viability.

Butler (F. C.). **Eyespot lodging of Wheat.**—*Agric. Gaz. N.S.W.*, **68**, 7, pp. 340–343, 2 fig., 1957.

The occurrence of *Cercosporella herpotrichoides* was established for the first time in New South Wales [map 74] during the 1956–7 season. Infection was widespread in the southern region, only wheat apparently being affected. A dense undergrowth of subterranean clover provided extremely favourable conditions for eyespot development; where wheat is used as a cover crop on land with a previous history of the disease the clover seeding rate should be kept low. Previous records of the disease include one from Victoria.

Lal (S. B.), Sill (W. H.), Del Rosario (Maria S.), & Kainski (J. M.). **Three new naturally occurring strains of Wheat streak mosaic virus in Kansas and the Great Plains.**—Abs. in *Phytopathology*, **47**, 9, p. 527, 1957.

Three new symptom types of wheat streak mosaic virus [**36**, p. 389], designated as the white mottle, leaf rolling, and leaf striping strains, and additional to the yellow and green strains already known, were best identified on Pawnee wheat at 70° F. in the greenhouse. The yellow and leaf rolling strains were the most virulent. Pawnee was susceptible to all strains, Concho intermediate, and Triumph tolerant.

Luig (N. H.) & Baker (E. P.). **A note on a uredospore colour mutant in Barley leaf rust, Puccinia hordei Otth.**—*Proc. Linn. Soc. N.S.W.*, **81**, 2, pp. 115–118, 2 fig., 1957.

At the Faculty of Agriculture, University of Sydney, a yellow mutant of race UN 14 of *P. hordei* was obtained in pure culture. The pathogenicity of the mutant was identical with that of the parent race although some morphological and physio-

logical differences were apparent. The study of competition trends with other races on susceptible barley varieties will be facilitated by the use of this mutant.

Grumbach (A.) & Stoll (C.). **Gewinnung von Claviceps purpurea (Fr.) Tul. —Stämmen mit Peptidalkaloidbildung in vivo.** [Development of *Claviceps purpurea* (Fr.) Tul.—Strains producing peptide-alkaloid *in vivo.*]—*Schweiz. Z. allg. Path.*, **20**, 2, pp. 145–149, 1957. [French and English summaries.]

It is reported in this joint contribution from the Hygiene-Institut der Universität, Zürich, and the Eidg. Technische Hochschule that the exposure of conidia of *C. purpurea* to a specific immune serum resulted in the isolation of 5 strains which produced peptide-alkaloids characteristic of the ergotoxin group *in vitro* and continued to do so for 5 years [cf. **36**, p. 758].

Rikish (S.) & Dickson (J. G.). **The influence of light and temperature on the development of Corn rust.**—Abs. in *Phytopathology*, **47**, 9, p. 532, 1957.

The parasitism of *Puccinia sorghi* [**36**, p. 466] on maize was influenced more by temperature than light, though additional light increased necrosis round the uredia. High temp. (33° C.) and low light checked rust development in some inbred lines after initial invasion; 28° checked full expression of resistance in most seedlings. Some inbred lines were susceptible within one temperature range and resistant within another. Decreased temperature increased the incubation period, and the temperature and light levels before inoculation affected the type of uredia and amount of sporulation. Susceptibility of seedlings sometimes decreased with age, though not at higher temperatures.

Kahn (R. P.) & Dickerson (O. J.). **Susceptibility of Rice to systemic infection by three common cereal viruses.**—Abs. in *Phytopathology*, **47**, 9, p. 526, 1957.

The mechanical inoculation of 18 rice varieties, 2–3 weeks old, with barley stripe [mosaic], brome mosaic, and wheat streak mosaic viruses [cf. **36**, p. 389], followed by incubation at 70–75° F. for 3 weeks showed that none was susceptible to three isolates of wheat streak mosaic virus, 3 were to 2 isolates of brome mosaic virus, and these, with 4 others, reacted to 1 uncontaminated isolate of barley stripe mosaic virus, though none was susceptible to this virus taken from plants from infected seed. These results indicate the possible use of rice varieties as differential hosts for cereal viruses.

Annual Report of the West African Rice Research Station, 1955.—28 pp., 1 pl., 1 plan, 1957. 1*s.*

Piricularia oryzae and *Helminthosporium oryzae* [*Cochliobolus miyabeanus*] were common in the nurseries of the Station (Rokupr, Sierra Leone), but caused no serious damage. One panicle of Kav. 12 was attacked by *Ustilaginoidea virens* [cf. **36**, p. 381].

Annual Reports of the Central Rice Research Institute, Cuttack, for the years 1953–54, 1954–55.—47 pp., 1955; 48 pp., 1956. [Received 1957.]

In the section of the first report dealing with mycology (pp. 36–39) [cf. **35**, p. 228] studies on the anatomy of rice plants infected by *Helminthosporium* disease [*Cochliobolus miyabeanus*] showed that the fungus spread laterally in the susceptible variety Benibhog but was confined between the vascular bundles in the resistant Ch. 13 and Ch. 45. No differences were noted in the time required for penetration and development of infection in these varieties. In a seed treatment trial lower disease incidence and higher yield were associated with special agrosan compared with the other treatments.

In second-crop varietal trials for resistance to blast [*Piricularia oryzae*] the

vars. PTB 10, Ch. 55, B.J. 1, SM. 8, R.I.A.R.I., T. 6522, and H. 755 remained free from infection despite inoculation as seedlings. The best control of *P. oryzae* was given by coppesan sprays, with a yield increase of 75% over the untreated. It was estimated that the loss in yield/acre for every 1% increase of neck infection by *P. oryzae* was 24·46 lb.

In a trial of Chinese varieties symptoms resembling pansukh disease [cf. **36**, p. 57] were noticed; out of 15 varieties ADT. 4 and ADT. 20 were resistant and Benibhog, B. 76–1, and PTB. 10 moderately so. The symptoms disappeared when stagnant water in the fields was replaced by fresh, running continuously for 48 hr., and recovery was aided by a dressing of ammonium sulphate at 20 lb./acre.

In the mycology section of the second report (pp. 35–40) it is stated that 16 early rice varieties were susceptible in the adult stage to *C. miyabeanus* and 1 to *P. oryzae*.

In field trials with 37 previously selected resistant or moderately resistant varieties, 20 lb. N/acre was applied in the seed bed and 60 lb. in the field and the very susceptible Co 13 grown alongside the test varieties; 9 were found to be resistant and 5 moderately resistant to *P. oryzae*. Sprays of Bordeaux mixture (5:5:50), perenox (0·5%), coppesan (0·5%), and cupravit (0·5%) were all effective in significantly reducing the percentage of neck infection by *P. oryzae*. The best treatment comprised 2 sprays before flowering and 2 after. Losses from blast were estimated at 0·43% from plot yields and 1·3% from sample yields for every 1% increase in neck infection. Significantly higher yields and lower neck infection were given by both normal and low-volume sprays in comparative trials. In seed treatment trials none of the treatments gave a significant difference in control of disease in mature plants.

Schneider (H.). **Chromatic parenchyma cells in tristeza-diseased Citrus. Anatomical response of some Citrus species to tristeza virus.**—Abs. in *Phytopathology*, **47**, 9, pp. 533–534, 1957.

The initial response of Mexican lime seedlings graft-inoculated with citrus tristeza virus was a thickening of the cytoplasmic layer in and intensified staining of the elongated parenchyma cells adjoining the sieve tubes, cells so affected being termed chromatic. The central vacuole was reduced and sometimes divided, and more deeply staining masses appeared, subsequently dividing into needle-like bodies and on occasion staining with Giemsa stain as do viruses. Neighbouring phloem parenchyma and other tissue may become chromatic also. Such cells were also found in Meyer lemon trees, Lisbon lemon seedlings with seedling yellows, and above (not below) the bud union of sweet and sour orange.

In the 2nd abstract it is stated that hypertrophy of partially chromatic cells and adjoining tissue occurred, crushing some chromatic cells, and was followed by hyperplasia and failure of normal tissue differentiation. Disorganized soft tissue replacing xylem and phloem causes pitting of the wood, with subsequent stem pitting and vein clearing. This type of disorganization is quite different from the sieve-tube necrosis and subsequent disturbances in sour orange rootstock bearing tristeza-affected sweet orange, and this root stock injury is therefore probably caused by the diseased scion rather than by the virus.

Moore (P. W.) & Nauer (E.). **Scaly bark disease of Citrus.**—*Calif. Agric.*, **11**, 6, pp. 11, 15, 5 fig., 1957.

This information on citrus psorosis virus has already been noticed [**35**, p. 179].

Fisher (Fran[cenia] E.). **Re-evaluation of the etiology of Citrus greasy spot.**—Abs. in *Phytopathology*, **47**, 9, pp. 520–521, 1957.

Citrus greasy spot in Florida [**36**, p. 584] is now attributed to the *Cercospora* state of *Mycosphaerella* sp.

Berkenkamp (B. B.) & Streets (R. B.). **Infection studies with the southwestern Cotton rust pathogen, Puccinia stakmanii.**—Abs. in *Phytopathology*, **47**, 9, pp. 516–517, 1957.

Teleutospores of *P. stakmanii* [**22**, p. 385] germinate only when thoroughly wet, and then within 7 hr. at room temperature. Pycnia appear in the field in 4 days and aecidia in 14 days after rain; 24 hr. high R.H. suffices for infection, wet leaves being found less susceptible than dry. Natural occurrence is erratic. A parasite of the aecidia is probably *Tuberculina persicina*.

Erwin (D. C.) & Kennedy (B. W.). **The relationship of Rhizoctonia solani to a root rot disease of Flax.**—Abs. in *Phytopathology*, **47**, 9, p. 520, 1957.

During Feb.–Apr. a disease of flax tap roots in southern California in which the periderm became orange in colour and constrictions or lesions occurred was associated with *R.* [*Corticium*] *solani*, an isolate of which caused seedling disease and root rot of flax, in greenhouse inoculations.

Goossens (J. A. A. M. H.). **Ziekteverschijnselen van Vlas veroorzaakt door Verticillium.** [Pathological symptoms on Flax caused by *Verticillium*.]—*Versl. PlZiekt. Dienst Wageningen* 129 (*1955*), pp. 177–178, 1956. [English summary. Received Oct. 1957.]

It was demonstrated experimentally in 1952 that *V. dahliae* f. *zonatum* was pathogenic to flax in the Netherlands (*Versl. PlZiekt. Dienst Wageningen* 120 (*1951–2*), p. 181, 1953) [cf. **35**, p. 531]. In a more extensive trial in 1955 with 9 varieties the symptoms resulting from the inoculation with a spore suspension on 20–21 May of seedlings potted in a mixture of leaf mould and sand (2 : 1) included a yellow discoloration of the leaves, beginning with the oldest; wilting of a small percentage; the formation of small, brown, usually circular spots on the chlorotic and sometimes also on the green leaves, accompanied on the Formosa and Concurrent varieties by a brown discoloration of the veins; branching of the stems just above soil-level; and stunting and premature death of the plants. No serious damage, however, was caused.

Annual Report of the Jute Agricultural Research Institute (1955–56).—144 pp., [? 1957].

In the section [cf. **35**, p. 452] dealing with diseases of jute (pp. 52–60) it is stated that isolates of the stem rot pathogen (*Macrophomina phaseoli*) differed in pathogenicity, and that the disease was more severe in combination with *Pseudomonas* sp. and *Fusarium solani*. Anthracnose [*Colletotrichum* sp.] attacked new varieties as well as indigenous strains of jute. In a study of 8 strains of *M. phaseoli* from different areas it was found that the fungus was more virulent at 100° F. at a depth of 5 cm. in the soil than at lower temperatures. The best protection against seed-borne *C.* sp. was given by treatment with agrosan GN (30 or 60 min.). From studies of a number of *C.* isolates from jute it appears that the Indian, Malayan, and Japanese strains all belong to the same group, possibly *C. capsici*.

A severe seedling blight and collar rot of jute in west Bengal was caused by *Ozonium* sp. and in inoculation experiments *Corchorus olitorius* suffered 100% mortality. A common weed in the jute fields, *Cassia occidentalis*, was also a host. The pathogen rarely occurred on heavy clay soils. A greyish-brown and a deep brown strain were noted; the latter was also isolated from *Hibiscus cannabinus* and *H. sabdariffa*.

Pseudomonas sp. and *F. solani* were non-pathogenic when inoculated singly, but produced typical wilt symptoms when used together with *Macrophomina phaseoli* and *Ozonium* sp. from Tarakeswar. A new disease affecting JRC–212 in May was associated with *Curvularia subulata* and *Alternaria* sp.

In spraying trials against *Colletotrichum* and *M. phaseoli* perenox was the most effective of the copper fungicides, and maneb of the non-copper.

In the report of investigations at Tarakeswar (pp. 84–85) it is stated that a species of *Volutella*, thought to be undescribed, caused a brown rot of late crops of *H. cannabinus*. All varieties of *H. cannabinus* were susceptible to leaf infection and stem rot due to *Phoma sabdariffa*. In perithecia associated with this disease the hyaline to greenish, thick walled, lenticular ascospores were $12 \times 6{\cdot}2\,\mu$. Root rot of *H. cannabinus* was associated with *M. phaseoli* and *F. oxysporum*, alone or in combination, causing more damage together.

Roselle (*H. sabdariffa* var. *altissima*) was less susceptible to diseases than *H. cannabinus*, and was immune from brown rot and stem rot due to *P. sabdariffa* (though not to leaf infection), but susceptible to *M. phaseoli* and *F. oxysporum* root rot.

Sunn-hemp (*Crotalaria juncea*) was very susceptible to root rot (*F. vasinfectum*) [cf. **19**, p. 584].

Chowdhury (S.). **A Cercospora leaf spot of Ramie in Assam.**—*Trans. Brit. mycol. Soc.*, **40**, 2, pp. 260–262, 1 fig., 1957.

The occurrence of *Cercospora boehmeriae* on ramie (*Boehmeria nivea*) in Assam is noted, constituting a new record for India. The leaf-spotting caused by the fungus is not severe and may be controlled by copper fungicides.

Moreau (Mireille). **Évolution du complexe lignifiant de l'Œillet cultivé sous les attaques du Phialophora cinerescens.** [The development of the lignifying complex in the cultivated Carnation during attack by *Phialophora cinerescens*.] —*Rev. Mycol., Paris*, **22**, 2, pp. 155–165, 1 pl. (after p. 255), 1 fig., 1957.

Laboratory studies of carnations attacked by *P.* [*Verticillium*] *cinerescens* [cf. **36**, p. 762] showed that the effect of infection upon lignification is, locally, partially to inhibit the formation of the woody ring and to cause a regression of the tissues already lignified. The effect at a distance is to increase lignification and to cause a weak but normal differentiation and lignification of the vessels of new tissues. The gummosis associated with *V. cinerescens* is abundantly present in the tissues and seems to be a defence reaction by the host. As the gummosis spreads rapidly in living tissues, the annular arrangement of the lignified tissues may prevent it from exerting a fatal effect on the cells and allow the development of subero-phelloderm which may, temporarily at least, hinder the advance of the parasite. This, perhaps, explains the different degrees of resistance of varieties previously classified by the author according to the anatomical character of their xylem, the growth of which and the induration of the parenchyma associated with gummosis account for the stiff, brittle habit of infected carnations.

Baker (R.). **The height of invasion of two pathogens in Carnation stems.**—Abs. in *Phytopathology*, **47**, 9, p. 516, 1957.

Inoculation of carnations with *Fusarium oxysporum* f. *dianthi* [*F. dianthi*: **36**, p. 589] and *F. roseum* and subsequent platings from the stem up to 24 in. yielded *F. dianthi* once at 18 in., but generally not above 4–6 in., and *F. roseum* never above 2 in. The latter is, therefore, considered unlikely to be carried in cuttings, and it was not isolated from any of 2 mm. sections of cuttings taken from infected plants.

Naito (N.) & Ouchi (S.). **Occurrence of the Gladiolus leaf spot by Curvularia lunata in Japan.**—*Tech. Bull. Kagawa agric. Coll.*, 7, 2, pp. 135–140, 2 fig., 1956. [Japanese. Abs. from English summary. Received 1957.]

The occurrence of *Curvularia lunata* [cf. **36**, p. 187] causing a leaf spot of gladiolus is reported for the first time in Japan, and a description given of the morphological and physiological characteristics of the pathogen.

MILLER (H. N.). **An Alternaria leaf spot of Schefflera actinophylla.**—Abs. in *Phytopathology*, **47**, 9, p. 529, 1957.

A severe leaf spot disease of *Schefflera*, observed in Florida greenhouses for several years, is attributable to a new species of *Alternaria* (to be described); conidia are dark brown, $70–185 \times 18–45 \mu$, 8–15 transversely septate, and deeply constricted at the septa. Leaf lesions are circular, brown, and up to 35 mm. diam.

'T JOLLE (J.). **Bodemmoeheid bij Lathyrus.** [Soil sickness in relation to *Lathyrus*.] *Cult. en Hand.*, **23**, 8, pp. 196–197, 1957.

This is a popular note on the root rot of sweet peas caused by *Thielaviopsis basicola* in the Netherlands, a more detailed study of which has already been noticed [**32**, p. 380].

WEBER (G. F.) & CHANGSRI (W.). **Septoria leafspot of Marigold, Tagetes erecta.**—Abs. in *Phytopathology*, **47**, 9, p. 537, 1957.

Leaf lesions of *Septoria* sp. were severe on *T. erecta* in Gainesville, Florida, in 1956. Initially 0·25 mm. diam. and slightly sunken, they enlarged later, becoming shiny brown. Leaflets were distorted, often being entirely affected eventually. The pycnidia were $60–80 \mu$ diam., the spores slender, slightly curved, hyaline, usually 3-septate, and $20–30 \times 1–2 \mu$.

RAABE (R. D.). **Fusarium wilt of Hebe buxifolia.**—Abs. in *Phytopathology*, **47**, 9, p. 532, 1957.

A wilt of *H. buxifolia* (*Veronica buxifolia*) caused by a form of *F. oxysporum* started as a progressive chlorosis, followed by browning of the leaves from the base of the stem upwards, and became serious in a San Francisco Bay nursery, California. Other herbaceous Scrophulariaceae did not become infected by inoculation. The fungus is named *F. o.* f. *hebae* [nom. nud.].

MALLACH (N.). **Viruskrankheiten und virusähnliche Erkrankungen des Kern- und Steinobstes.** [Virus diseases and virus-like disorders of pome and stone fruits.] —Obst- und Gartenbauverlag, Munich, 36 pp., 26 fig. (11 col.), 1956. [35 refs. Received 1957.] DM 4.90.

After a general introduction on viruses and virus diseases and a review in tabular form of the symptoms of various virus diseases on leaves, twigs, branches, blossoms, and fruit, the author gives brief descriptions of 8 virus and virus-like diseases of pome fruits and 14 such diseases of stone fruits.

SMOLÁK (J.) & NOVÁK (J. B.). **Příspěvky k virologii óvocnych plodin.** [A contribution to the virology of fruit trees.]—*Acta Univ. Agric. Praha, 1956*, pp. 99–118, 15 fig., 1956. [Russian and English summaries. Received Sept. 1957.]

Three diseases of virus origin are reported on fruit trees in Czechoslovakia. Willow leaf of pear is stated to be very widespread and is graft-transmissible. Evidence suggests that it is not due to zinc deficiency as previously suggested. Plum pox [cf. **36**, p. 252] is serious and caused 70–90% yield loss in certain localities. Sweet cherry necrosis, not previously reported, was observed near Prague. The disease is characterized by markedly deformed fruits, which do not reach maturity and bear black or dark brown spots 1 to 2 mm. diam. Shoots were dwarfed and dry and useless for grafting. Standard hygienic measures for the control of virus diseases are recommended.

TANIĆ (B.) & JORDOVIĆ (M.). **Nekoliko podataka o mozaiku Jabuke.** [Some data on Apple mosaic.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 37, pp. 69–71, 1956. [English summary.]

Apple mosaic virus [cf. **35**, p. 683], believed to have been present in Yugoslavia for a long time, was observed in 1955 near Banja Luka, Bosnia.

Hey (G. L.). **What we can do about bitter rot?**—*Grower*, **47**, 2, pp. 100–103, 3 fig., 1957.

This is a popular account of the incidence, factors affecting, symptoms, and control of bitter rot of Cox's Orange Pippin and Sunset apples caused by *Gloeosporium album* and *G.* [*Neofabraea*] *perennans* [**35**, p. 902]. Suitably timed captan sprays [**36**, p. 597] afford the best means of control.

Brook (P. J.). **Ripe spot of Apples in New Zealand.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 7, pp. 735–741, 4 fig., 1957.

Control of ripe spot of stored apples (*Gloeosporium* (*Neofabraea*) *perennans* and *G. album* [cf. **36**, p. 193]) in the Nelson district has so far been unsatisfactory. Recent investigations by the Plant Diseases Division, Auckland, showed that of several hundred stem cankers examined only 2 were caused by a *G.* species with curved spores. Conidia of *N. perennans* from branch cankers are most in evidence in autumn and spring, coinciding with the start and finish of winter pruning, and branch cankers from spring infections are a source of inoculum for that season's fruit. Both species infected fruit, causing identical ripe spots, the causal pathogen being identifiable only when it sporulated. It is suggested that none of the varieties grown are immune from the disease.

Contrary to the accepted belief that ripe spot is a storage disorder developing after 3–4 months in cool store, Delicious apples picked in mid-March 1955 and kept in a warm packing shed had well-grown lesions less than 3 weeks later. Despite the fact that apples are generally affected after picking, *N. perennans* can enter the immature fruit at points of damage. Fruit developing lenticel spot, a sign of advanced maturity, before cold storage is more readily affected by ripe spot than clean fruit. On ripe spots on windfalls of the early-maturing Monarch in the 3rd week in March 1955 conidia of both species were present, indicating that such fruit can serve as a source of infection for later maturing apples. This type of infection, however, is unlikely to occur in a normal commercial orchard.

Although ripe spot of fruit is the most important feature economically in the biology of the 2 species, it is only of minor significance in their life history. *N. perennans*, the main source of fruit infection in storage, perpetuates itself on branch cankers. It is suggested that *G. album*, equally important as a fruit rotting pathogen but rarely found sporing on fruit in the orchard or occurring as a branch parasite on apple, may have a range of other hosts for its perpetuation. Some notes are appended on the taxonomy of the 2 fungi.

Sewell (G. W. F.). **Collar rot of Apple trees.**—*Rep. E. Malling Res. Sta., 1956*, pp. 168–169, 2 pl., 1957.

The symptoms of apple collar rot caused by *Phytophthora cactorum* are described and suggestions made for control [cf. **35**, p. 875; **37**, p. 47]. The disease has been recognized now in Essex, Kent, Sussex, and Worcestershire.

Moore (M. H.). **Research and the problem of Apple scab control.**—*Rep. E. Malling Res. Sta., 1956*, pp. 161–167, 1957.

Under the heading 'bulletin for fruit growers' the life-cycle of the apple scab pathogen [*Venturia inaequalis*] and the requirements for infection are briefly outlined as an introduction to a review of research on various methods of field control [cf. **36**, p. 602 *et passim*].

Gjærum (H. B.). **Sekksporemodning, spreiing og infeksjon hos Epleskurv.** [Ascospore ripening, dissemination, and infection in Apple scab.]—*Meld. Pl. Pat. Inst., Oslo*, 13, 48 pp. [undated, received Oct. 1957. English summary. 57 refs.]

Following a survey of important contributions to the knowledge of apple scab

(*Venturia inaequalis*) under the headings of history, biology, spore-trapping apparatus, chemical control, and warning systems, the author reports and tabulates the results of field and laboratory investigations in Norway [**31**, p. 559 *et passim*] during 1951–55.

The time of maturation fluctuated irregularly in different years and in various localities, the first ripe spores appearing at any stage of fruit-bud development between dormant and mouse-ear [cf. **36**, p. 193]. The spores are adjudged to be mature when discharge is obtained from wetted leaves. The first infections, in the form of a hypophyllous spot near the leaf tip, were observed from the breaking stage at the beginning of May until petal-fall, just after mid-June. Ascospore dissemination usually ceases at the end of June.

Spraying programmes were based on (*a*) the phenology of the host and (*b*) the Mills method for the determination of the infection period [cf. **35**, p. 830], which appeared to be applicable under Norwegian conditions [cf. **35**, p. 302]. In seasons when infection is late in starting, as in 1951 and 1952, one or more treatments may be omitted in the spring. If organo-mercurials, e.g., mercury-Kverk (7·5% phenylmercurytriethanol ammonium lactate (3% Hg); Gallowhur Chemical Corporation, U.S.A.), or murfixtan (phenylmercuryfixtan (0·8% Hg); Murphy Chemical Co., Ltd., England), are used the first application may be postponed until after the onset of infection.

Kirkham (D. S.). **A culture technique for Venturia spp. and a turbidimetric method for the estimation of comparative sporulation.**—*Rep. E. Malling Res. Sta., 1956*, pp. 125–127, 1 pl., 1 graph, 1957.

This is an expanded account of information already noticed [**36**, p. 35].

Kirkham (D. S.). **Studies of the significance of polyphenolic host metabolites in the nutrition of Venturia inaequalis and Venturia pirina.**—*J. gen. Microbiol.*, **17**, 1, pp. 120–134, 1 pl., 1957.

In further studies at East Malling Research Station extracts of the polyphenolic fractions of the water-soluble metabolites were prepared from apple and pear varieties with different degrees of resistance to *V. inaequalis* and *V. pirina*, respectively [cf. **35**, p. 898, and see below]. Qualitative differences were chiefly interspecific, extracts of resistant varieties being without major components lacking in less resistant ones. Cultural reactions of distinct clones of each fungus to the extracts, in the presence of various basal media, were noted. Growth and sporulation were inhibited independently by extracts of less resistant and resistant varieties. The clones were not equally susceptible to host metabolites, those of *V. inaequalis* showing relationships between inhibition of sporulation by polyphenols and their varietal host ranges. Fluctuations in the pathogenicity of a clone of *V. pirina* during storage in culture, with periodic re-isolation from Williams pear, were reflected in its reactions to the extracts. Both fungi decomposed the polyphenols.

It is evident that polyphenolic host metabolites play a highly significant part in the metabolism of the pathogens in artificial culture, and the results obtained suggest that they may operate as resistance factors.

Kirkham (D. S.). **The significance of polyphenolic metabolites of Apple and Pear in the host relations of Venturia inaequalis and Venturia pirina.**—*J. gen. Microbiol.*, **17**, 2, pp. 491–504, 1 pl., 20 graphs, 1957.

In additional studies on this subject [see above] *V. inaequalis* was inoculated into apple shoots and *V. pirina* into pear, the hosts then being injected with metabolites extracted from apple and pear leaves. Both fungi were inhibited by the metabolites from the highly susceptible Cox's Orange Pippin apple and Williams'

Bon Chrétien pear injected back into the same varieties, showing that the occurrence of these potential resistance factors is not confined to scab-resistant varieties. The injection treatments were most effective when applied near the time of inoculation. Infection was inhibited most markedly in those leaves already developing a mature resistance. Susceptibility of Cox to *V. inaequalis* was increased by the injection of urea. Both *V. inaequalis* and *V. pirina* were inhibited by chlorogenic acid and *iso*chlorogenic acid; some indication was obtained of synergism between the two compounds as resistance factors.

Newhook (F. J.). **A Pythium disease of Pear trees.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 5, pp. 533–538, 5 figs., 1957.

A species of *Pythium* is responsible for the steady deterioration of pear trees observed during the past 16 years in a number of Te Kanwhata orchards, where incidence has reached up to 20%; orchards in Henderson, Huapai, and Hastings are affected to a lesser extent. The fungus attacks the phloem of trunks, leaders, and occasionally small branches, producing in one layer of the inner phloem a distinct orange stain which deepens and eventually turns black. The affected parts of the tree stop growing and leaves are shed prematurely. Fruits remain small and hard, while the affected limbs die, often being attacked secondarily by *Diaporthe perniciosa, Stereum purpureum,* and *Coriolus* [*Polystictus*] *versicolor.* The entire tree is killed within 3–10 years. The disease occurs on most pear varieties and was observed twice on apple. Control measures suggested include the avoidance of root injuries, through which the fungus apparently gains entrance, removal of badly affected leaders or trees, and, possibly, pre-planting treatment of the soil on infected sites if pears and apples are to be grown again.

Harvey (H. L.). **Stony pit of Pears.**—*J. Agric. W. Aust.*, **6**, 3, pp. 329–331, 3 fig., 1957.

The symptoms and transmission of stony pit virus of pears [**36**, p. 105] are described. The disease, which was first recognized in Western Australia in 1945, but from old records may have occurred there 30 years ago, has affected Josephines at Mundaring and Argyle and Packham's Triumph at Mundaring and Bridgetown. Incidence has so far been low. The only means of control is by propagation from healthy stock.

Diener (T. O.) & Weaver (M. L.). **A Penicillium causing wilt in Peach and Pear seedlings.**—Abs. in *Phytopathology*, **47**, 9, p. 519, 1957.

Peach and pear seedlings growing in Hoagland solution in the greenhouse wilted, apparently from the action of a toxin (rather than parasitism) produced by a species of *Penicillium*, which was isolated from the roots. Addition of mats of the fungus to the solution produced the same result. Arsenic (10 p.p.m.) checked growth of the fungus. Cucumber, soybean, pea, and Pinto bean [*Phaseolus vulgaris*] did not react to inoculation.

Hutton (K. E.). **Reaction of stonefruit trees to fungicides.**—*Agric. Gaz. N.S.W.*, **68**, 7, pp. 357–359, 387, 2 fig., 1957.

It has been found that thiram can be used with safety on apricots, which are particularly sensitive to most fungicidal sprays. If sprays containing copper are used on almonds when the trees are in leaf severe shot-holing or leaf-scorching and subsequent defoliation may be expected. The reaction of peaches to fungicides varies, early maturing varieties in coastal districts being the most sensitive. Plums are less sensitive than all other stone fruits except cherries, though some reactions depend on variety and district.

Ehlers (C. G.) & Moore (J. D.). **Mechanical transmission of certain stone fruit viruses from Prunus pollen.**—Abs. in *Phytopathology*, **47**, 9, pp. 519–520, 1957.

Four hosts, including tobacco and watermelon, developed symptoms when infected by inoculum prepared by grinding pollen from plum and sour cherry infected by stone fruit viruses with 0·01 M sodium phosphate buffer at pH 8. Viruses A, B, E, and G were differentiated by this means [**36**, p. 599].

Willison (R. S.) & Weintraub (M.). **Properties of a strain of Cucumber mosaic virus isolated from Prunus hosts.**—*Canad. J. Bot.*, **35**, 5, pp. 763–771, 1 pl., 1957.

In further studies at the Plant Pathology Laboratory, St. Catharines, Ontario [**34**, p. 304], a latent virus from *Prunus* hosts, designated CMVP (cucumber mosaic virus, *Prunus* strain) induced symptoms in bean (*Phaseolus vulgaris*), cowpea, cucumber, *Datura stramonium*, *Nicotiana glutinosa*, petunia, tobacco, spinach, sugar beet, Swiss chard, and zinnia. The thermal inactivation point lay between 65 and 70° C. and the dilution end point between 10^{-3} and 10^{-4}. The virus was transmitted by *Aphis gossypii* and *Myzus persicae* between cucumber and tobacco, and infected tobacco plants were partially protected against cucumber mosaic virus but not tobacco ring spot virus. CMVP resembled both lucerne mosaic virus and cucumber mosaic virus, but the particle size (about 35 mμ diam.) and immunological relationships suggest it is a strain of the latter. This virus is not considered to be involved in the etiology of cherry virus yellows and related diseases.

Milbrath (J. A.). **The relation of Peach ring spot virus to Sour Cherry yellows, Prune dwarf, and Peach stunt.**—Abs. in *Phytopathology*, **47**, p. 529, 1957.

From single buds of prune branches with normal foliage and others with prune dwarf [virus] foliage two strains of virus were isolated via peach to White Scallop squash [**36**, p. 332]. The isolate from normal foliage caused severe mottle and necrosis of the first leaf and necrosis of the growing point of the squash, that from the prune dwarf virus caused stunting and foliage stipple mottle. This is considered to indicate that the virus causing prune dwarf is a specific strain of peach ring spot virus. Other studies indicated peach stunt [loc. cit.] and sour cherry yellows viruses also to be strains of peach ring spot virus.

Yarwood (C. E.). **Contact transmission of Peach ring spot virus.**—Abs. in *Phytopathology*, **47**, 9, p. 539, 1957.

One strain (but not others) of peach ring spot virus [see above] from apricot in California was mechanically transmitted to beans [*Phaseolus vulgaris*], and by leaf friction between inoculated and non-inoculated beans in the same pot.

Nyland (G.). **Heat inactivation of ringspot virus in some stone fruit hosts.**—Abs. in *Phytopathology*, **47**, 9, p. 530, 1957.

[Peach] ring spot virus [see above] was inactivated in parts of trees of Stockton Morello sour cherry and sweet cherry and in Lovell peach seedlings held for 17–24 days at 100° F. air and 85° soil temperature. For 9 months after budding vegetative progeny of Stockton Morello trees so treated have indexed negatively for the virus. Generally, treated plants showed shock symptoms 3–4 weeks after latent or dormant buds started growth, but propagation had meanwhile been possible before virus reinvasion.

Lovell peach seedlings carrying peach ring spot in association with other stone fruit viruses indexed negatively for the ring spot after 24 and 32 days' heating but not after 17; some seedlings survived 43 days' heat. The virus was inactivated more easily in cherry than in peach.

Schlocker (A.), Wagnon (H. K.), & Breece (J. R.). **Some host-range studies of Peach yellow bud mosaic virus.**—Abs. in *Phytopathology*, **47**, 9, p. 533, 1957.

Details are given of a number of plum, peach, and cherry stock and scion combinations budded with peach buds carrying peach yellow bud mosaic virus. Wickson plum (*Prunus salicina* × *P. simonii*), Manchu cherry (*P. tomentosa*), apricot on Lovell peach, and Kelsey plum (*P. salicina*) developed symptoms suggestive of the virus.

Wagnon (H. K.) & Traylor (J. A.). **Results of some soil treatments for elimination of Peach yellow bud mosaic virus from soil.**—Abs. in *Phytopathology*, **47**, 9, p. 537, 1957.

Peach seedlings were grown in composite samples from the top 4 in. and next 14 in. of soil containing roots of peach trees infected by yellow bud mosaic virus [see above]. Parts of the soil were subjected to 6 different standard soil disinfection treatments. No virus infection appeared in seedlings grown in the treated soil or in the untreated upper soil, but 30 cases occurred in the untreated lower soil.

Jordović (M.) & Nikšić (M.). **Uticaj šarke Šljive (Prunus virus 7-Khristov) na prinose i hemisko-technološka svojstva plodova Šljive požegače.** [The effect of Prunus virus 7 Khristov on the yield and on the chemical and technological properties of Požegača Plums.]—*Arh. poljopr. Nauk.*, **10**, 28, pp. 85–95, 1957. [English summary.]

At the Institute for Fruit Growing, Čačak, Yugoslavia, Požegača plums infected by plum pox virus [**36**, p. 195] were found to be changed morphologically rather than chemically; weight was reduced by 20% and size by 20·1%, while 40·5% of the fruit fell prematurely, of which 13% was a complete loss. Sugar content was reduced by 1·6% and acids increased by 0·127%, resulting in a poor flavour. Processing as dried fruit or jam was not profitable and brandy made from diseased plums had a low alcohol content and unpleasant flavour.

Stojanović (D.) & Kostić (B.). **Prilog proučavanju biologije Polystigma rubrum.** [A contribution to the study of the biology of *Polystigma rubrum*.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 37, pp. 21–27. 4 graphs, 1956. [English summary.]

Studies at the Institute for Agricultural Researches, Kragujevac, Yugoslavia, from 1951–54 on the physiology of *P. rubrum*, which is very widespread on plums in Yugoslavia [**34**, p. 134] and Bulgaria [**25**, p. 170], showed that on the variety Požegača perithecial development and infection periods vary considerably from year to year and that ascospore discharge always begins before the end of blossoming. In spraying trials in 2 localities in 1955, 1 application of 2% Bordeaux mixture or colloidal copper immediately after flowering gave protection to the leaves even when disease attacks were heavy (42 spots/leaf). The latter fungicide was slightly more effective.

Stojanović (D.) & Kostić (B.). **Parazitiranost stroma Polystigma rubrum sa Gloeosporium polystigmicolum u toku 1955 godine.** [Parasitism of the *Polystigma rubrum* stroma by *Gloeosporium polystigmicola* in 1955.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 37, pp. 91–92, 1956. [English summary.]

A survey of 46 plum orchards in western Serbia, Yugoslavia, in Aug.–Oct. 1955, a year of heavy rainfall, showed that *G. polystigmicola* was responsible for a mass destruction of *P. rubrum* stromata. The incidence of parasitism was 40–100%, a percentage that can greatly influence the intensity of *P. rubrum* infection in the following year.

Ogawa (J. M.). **The dried fruit beetle disseminates spores of the Peach brown rot fungus.**—Abs. in *Phytopathology*, **47**, 9, p. 530, 1957.

Carpophilus hemipterus was observed to become contaminated with spores of *Sclerotinia fructicola* by feeding on diseased peach fruits and to be able to transmit the disease to naturally wounded peaches.

Szkolnik (M.) & Hamilton (J. M.). **Control of Peach leaf curl with omadine and of brown rot with omadine and certain antibiotics.**—*Plant Dis. Reptr*, **41**, 4, pp. 289–292, 1957.

At the New York State Agricultural Experiment Station, Geneva, peach leaf curl (*Taphrina deformans*) [**35**, p. 379] was effectively controlled by the iron salt of 2-pyridinethione 1-oxide (omadine 1565) [**37**, p. 46] in both autumn and spring applications. The zinc salt, OM 1563, was as effective a pre-harvest spray as captan for the control of brown rot of peaches (*Sclerotinia fructicola*) [**35**, p. 464]. One pre-harvest spray of OM 1563 1:100 or captan 50W 2:100 was equal to 3 applications of micronized sulfur 4:100 or thioneb $1\frac{1}{4}$:100. OM 1536 1:100 is considered superior to micronized sulfur or captan in dip treatment. At 100 and 200 p.p.m. mycostatin, fungichromin, and oligomycin were as effective as OM 1563.

Dimarco (G. R.) & Davis (B. H.). **Prevention of decay of Peaches with post-harvest treatments.**—*Plant Dis. Reptr*, **41**, 4, pp. 284–288, 1957.

At New Jersey Agricultural Experiment Station, New Brunswick, in 1955–6, mycostatin (nystatin) [see above] and dowicide A-M245 gave the best results (which are tabulated) in tests for the control of brown rot (*Monilinia* [*Sclerotinia*] *fructicola*) [cf. **35**, p. 464] and *Rhizopus* [*stolonifer*: **35**, p. 379] on peaches, mycostatin being the more effective.

Dye (D. W.). **The effect of temperature on infection by Pseudomonas syringae Van Hall.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 5, pp. 500–505, 1 fig., 2 graphs, 1957.

In greenhouse inoculation experiments at the Plant Diseases Division, Auckland, the optimum temperatures for infection of peach trees by *P. syringae* [**36**, p. 331] were 18·2° C. for stems and 20·1° for leaves.

Carter (M. V.). **Eutypa armeniacae Hansf. & Carter, sp. nov., an airborne vascular pathogen of Prunus armeniaca L. in southern Australia.**—*Aust. J. Bot.*, **5**, 1, pp. 21–35, 1 pl., 1957.

From the Waite Agricultural Research Institute, Australia, the causal organism of apricot gummosis [**36**, p. 598 *et passim*] is named *Eutypa armeniacae* [**36**, p. 770] and described as new. The perithecia are up to 450 μ diam., with a fleshy-membranaceous wall up to 30 μ thick. The asci are cylindric-clavulate, and the ascospores pale yellowish-brown when mature, $7–11 \times 1·5–2\,\mu$. The conidia of the imperfect state, *Cytosporina* sp., are $18–25 \times 1\,\mu$, and the pycnidia are immersed in erumpent stromata, 1–2 mm. diam. In culture and by inoculation the relationship and pathogenicity of the two states were demonstrated.

Ascospore discharge may be expected with more than 0·05 in. rain. It is probable that most infection occurs in Sept.–Nov., and the nature and viability of ejected ascospores make long-distance transmission theoretically possible. The few perithecia found in low-rainfall areas of S. Australia seem unable to account for the observed infection, which may be by air-borne inoculum from elsewhere; pycnidiospores would appear unlikely to be transferred except between adjacent branches. Recently perithecia of *E. armeniacae* have been found on dead grape vine wood, but the pathogen has been found on no other host so far.

English (H.), Ogawa (J. M.), & Davis (J. R.). **Bacterial blast, a newly recognised disease of Almonds in California.**—Abs. in *Phytopathology*, **47**, 9, p. 520, 1957.

A bacterial disease of almond affecting blossoms and young tissue, first noted in the Sacramento Valley in 1954 and epidemic on several varieties in 1956, was shown to be caused by *Pseudomonas syringae*.

O'Reilly (H. J.). **Relative efficiency of airplane and ground application of sprays in controlling Almond shot-hole disease.**—Abs. in *Phytopathology*, **47**, 9, p. 530, 1957.

Comparison of aeroplane (60 gal./acre) and conventional ground application (rather more than 300 gal./acre) of ziram at 50% bloom and petal fall to control *Coryneum beijerinckii* [*Clasterosporium carpophilum*] on almond in California resulted in 90% infection on air-sprayed and unsprayed fruit and 10% on ground-sprayed.

Raabe (R. D.). **Shot hole of Catalina Cherry.**—Abs. in *Phytopathology*, **47**, 9, p. 532, 1957.

Coryneum beijerinckii [*Clasterosporium carpophilum*] is recorded as causing shot hole of Catalina cherry (*Prunus lyonii*) in California, apparently a new host record.

Milatović (Ivanka). **Piegavost lišća Višnje — Coccomyces hiemalis Higg.** [Leaf spot of Sour Cherry—*Coccomyces hiemalis* Higg.]—*Zasht. Bilja* (*Plant Prot.*, *Beograd*), *1956*, 37, pp. 99–102, 2 fig., 1956. [English summary.]

Coccomyces [*Higginsia*] *hiemalis* is reported for the first time on sour cherries in Yugoslavia [map 58], where in 1956 it caused severe defoliation of several thousands of trees in the district of Slavonska Požega.

Crosse (J. E.). **Streptomycin in the control of bacterial canker of Cherry.**—*Ann. appl. Biol.*, **45**, 1, pp. 226–228, 1957.

Much of this work at East Malling Research Station on the control of *Pseudomonas mors-prunorum* has been noticed [**35**, p. 875; **36**, p. 535].

In the spring of 1955, a single 6:9:100 Bordeaux spray (at white bud) had no significant effect on leaf spot, whereas 3 sprays of streptomycin hydrochloride (220 i.u./ml.) applied at full bloom and at 75% and 100% petal fall reduced it by over 96% on Napoleon and 93% on Roundel. Bordeaux had no effect on inoculum potential estimated soon after petal fall. There were few bacteria on the streptomycin-treated leaves, but the number increased steadily in the next 6 weeks until it reached an equilibrium at half that on the unsprayed.

Two further sprays were applied against canker infections, the Bordeaux being used at low strength (2:3:100 on 2 Sept. and 4:6:100 on 4 Oct.) in order not to induce premature leaf fall. The streptomycin caused further small reductions in the leaf surface inoculum, the effect of the two sprays being cumulative. The inoculum potential was, however, reduced to a much greater extent by Bordeaux. Streptomycin reduced canker infection by 69% on Napoleon and 59% on Roundel, while the control by the Bordeaux (85 and 75%, respectively) was the best so far attained. [These results are also recorded by the author in *Rep. E. Malling Res. Sta. 1956*, pp. 170–172, 1957.]

Ridé (M.) & Bulit (J.). **Le chancre bactérien (Pseudomonas mors-prunorum Worm.) et les dépérissements du Cerisier en France.** [Bacterial canker (*Pseudomonas mors-prunorum* Worm.) and wilts of the Cherry tree in France.]—*C.R. Acad. Agric. Fr.*, **43**, 5, pp. 262–265, 1957.

P. mors-prunorum [cf. **36**, p. 654] is responsible for a disease which has in recent years caused significant damage to certain cherry varieties, such as Bigarreaux Marmotte, Moreau, and Napoléon, in the Paris region and the Departments of

Gard, Loir-et-Cher, and Yonne. This constitutes a new record for France. Control is by Bordeaux mixture applied at 1% immediately before and after leaf fall, at 0·6% before bud-burst, and at 0·4% in spring and summer [see above].

NICHOLS (C. W.) & MCCLAIN (R. L.). **A rough bark disease of Sweet Cherry in California caused by a graft-transmissible virus.**—Abs. in *Phytopathology*, **47**, 9, p. 530, 1957.

Severe rough bark and excessive gumming observed in young Lambert cherry in southern California in 1954 was transmitted by grafting to Gaume peach, Shirofugen flowering cherry, and sweet cherry (Lambert, Napoleon, Bing, and a Black Tartarian type). All developed typical ringspot symptoms, and 2–3 years after grafting rough bark and gumming developed on Lambert and Black Tartarian, but not on Napoleon or Bing. The rough bark symptoms start as discrete blisters, similar to those of cherry necrotic rusty mottle virus, which coalesce and rupture with exudation of gum.

MALLACH (N.). **Übertragbarkeit (im Sinne einer Virose) der Weißfleckenkrankheit der Kirsche.** [Transmissibility (in the sense of a virosis) of the white spot disease of Cherry.]—*Pflanzenschutz*, **9**, 8, pp. 116–117, 3 fig., 1957.

It has hitherto been assumed that white spot of cherry, a widespread leaf variegation, especially of the Rigi variety in Switzerland and Black Heart (Geisenheim) in Upper Franconia, Germany, was of genetic origin, arising through bud mutation. On two occasions in 1956, however, at the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, the confluent white spots and stripes were transmitted by grafting from affected Black Heart to healthy trees of bird cherry [*Prunus padus*] and Bigarreau Jaboulay, indicating that the symptoms are caused by a virus.

CORKE (A. T. K.). **Black currant leaf spot: a note on further laboratory tests of fungicides on overwintered leaves.**—*Rep. agric. hort. Res. Sta. Bristol, 1956*, pp. 120–122, [1957].

Further tests [cf. **35**, p. 201] confirmed that if black currant leaves are soaked in aqueous solutions (0·1%) of sodium pentachlorophenate (PCP) or sodium DNOC during winter, maturation of ascospores of *Pseudopeziza ribis* does not occur in the following spring. With reduction of the concentration to 0·0125%, sodium PCP was progressively less effective than sodium DNOC, which freshly prepared in aqueous solution at this strength gave complete inhibition, as did ammonium DNOC at 0·025%.

Although complete inhibition followed the laboratory treatment of dead leaves with 0·0125% DNOC in 3% diesel oil emulsion, no control resulted from the use of the same material at 0·1% as a ground spray applied in the field on 15 Dec. or 16 Feb. and the oil emulsion alone was not fungicidal in laboratory trials.

GEARD (I. D.). **Septoria leaf spot of Black currants.**—*Tasm. J. Agric.*, **28**, 3, pp. 226–232, 3 fig., 1957.

This information on the control of *Mycosphaerella ribis* has already been noticed [**35**, p. 689].

ZUCKERMAN (B. M.). **Fungicide concentrates applied by helicopter to Cranberry bogs in Massachusetts.**—*Plant Dis. Reptr*, **41**, 4, pp. 278–283, 1 fig., 1957.

At the University of Massachusetts Cranberry Experiment Station, East Wareham, 2 applications by helicopter of ferbam or zineb at 13 lb./13 gal. water/acre in 1955 and 2 or 3 of zineb at 9 lb. in 1956 gave control of cranberry rot [*Glomerella cingulata* var. *vaccinii* and other fungi: **26**, p. 347] in the field and in storage comparable with

that obtained with standard concentrations from ground equipment. Nozzle clogging was avoided by pre-mixing in a tank containing a mechanical agitator. Among the advantages were considerable labour saving and a 33% reduction in the cost of application.

HARDING (P. R.). **Preliminary tests of ammonia pellets for control of fungal decay of packaged Cranberries.**—*Plant Dis. Reptr*, **41**, 7, pp. 564–566, 1 fig., 1957.

Experiments by the Agricultural Marketing Service, Pomona, California, showed that after 12 days' storage in a forced-air ventilated room at 75° F. and 62% R.H. treatment with pellets depending on moisture absorption for release of ammonia [cf. **36**, p. 315] is effective against decay of cranberries caused by *Penicillium funiculosum* only when the fruit is packed in non-perforated bags. Owing to the injury caused by excessive ammonia accumulation in such bags, however, this treatment is impracticable.

GJÆRUM (H. B.). **Forsøk med nye kjemiske midler mot Stikkelsbærdræper.** [Experiments with new chemical remedies against Gooseberry mildew.]—*Frukt og Bær, 1957*, pp. 43–44, 1957.

The results of spraying experiments against *Sphaerotheca mors-uvae* on gooseberries in Norway during 1955–6 are presented [**36**, p. 258]. Treatment with karathane should be discontinued at least a fortnight before picking. The incidence of infection was further reduced to some extent by Kverk ultra-sulphur (0·2%): an increase in the concentration to ensure a stronger action would involve risk of injury to certain varieties.

GJÆRUM (H. B.). **Stikkelsbærdræper og vanlig starrust.** [Gooseberry mildew and common Sedge rust.]—*Småskr. LandbrDep. OpplysnTjen., Oslo*, **4**, 3 pp., 1 fig., 1957.

The life-history of *Sphaerotheca mors-uvae* is outlined. Highly resistant in Norway are the Finnish gooseberry vars. Lepaan Vallio and Hinnonmainen Keltainen, in contrast to the large-fruited Whitesmith and Whinham's Industry. Information regarding control by spraying with karathane [see above] is recapitulated. Dormant treatments, e.g., with 2·5% formalin, 10% lime-sulphur, or 6% copper sulphate may enhance the efficacy of summer sprays but cannot replace them.

Puccinia caricina, which overwinters on *Carex fusca* and produces reddish-yellow spots on gooseberry, red currant, and other *Ribes* spp., may be combated by 2–3 applications of ferbam at weekly intervals between bud burst and flowering. The occasional attacks of the rust on black currant are caused by a physiologic race overwintering on *C. gracilis* and *C. pseudocyperus*.

JEFFERS (W. F.). **Soil treatments for control of the red stele disease of Strawberries.**—*Plant Dis. Reptr*, **41**, 5, pp. 415–418, 1957.

Of the materials tested for the eradication of *Phytophthora fragariae* [**35**, p. 833] from infested soil at the Agricultural Experiment Station, College Park, Maryland, chloropicrin (3 ml./l.) proved the most effective, none of the strawberries planted 20 days after treatment contracting the disease. Arasan (72·5 g.) and CBP 55 (1-dichloro-3-bromopropane 55% at 5 ml.) were also effective but injurious to the plants. Under field conditions none of the materials eradicated the pathogen but methyl bromide (1 lb./100 sq. ft.) and chloropicrin (271 ml.) gave a high degree of control, the number of plants with red stele being reduced from 72% (untreated) to 1 and 4%, respectively.

FORD (D. H.) & WILHELM (S.). **Fruit deformity of Strawberry induced by a stigma-parasitizing fungus.**—Abs. in *Phytopathology*, **47**, 9, p. 521, 1957.

An unidentified moniliaceous fungus, widely found parasitizing the stigmas of

strawberries and also of *Fragaria chiloensis* and *Rubus ursinus* in southern and central California may cause deformation of fruit by preventing fertilization. Stigmas of other Rosaceae (but not of other families) can be inoculated successfully.

DIMARCO (G. R.) & DAVIS (B. H.). **Prevention of decay of Strawberries with post-harvest treatment.**—*Plant Dis. Reptr*, **41**, 5, pp. 460–464, 4 graphs, 1957.

Of the chemicals tested at the New Jersey Agricultural Experiment Station, New Brunswick, against rots of harvested strawberries (*Botrytis* [*cinerea*] and *Rhizopus* [*stolonifer*]) mycostatin (100 p.p.m.), added to the water in the hydrocooler, gave the best control. Captan was less effective and left a visible residue. Vacuum-cooled berries showed a high percentage of mould.

FULTON (J. P.). **An evaluation of the use of excised leaf grafts in Strawberry virus studies.**—Abs. in *Phytopathology*, **47**, 9, p. 521, 1957.

The results of leaf graft transmissions of strawberry mild mottle virus and of strains of strawberry latent virus [cf. **36**, p. 39] varied with the strain, but not with age of leaf of the donor or varying storage temperatures (from 21–36° C. for 24 hr. before grafting), though exposure to prolonged light periods reduced the efficiency of transmission. Mild mottle virus was more easily transmitted than [latent] virus [str.] C (epinasty virus) or latent virus [str.] A. Virus C was reduced in concentration (though probably not inactivated) by hot water treatment of picked leaves at 40–46° C. for 10 or 30 min. prior to grafting, facilitating the isolation of mild mottle virus from a complex containing strain C, which was isolated from the same complex by holding the grafted plant at 33° for 14 days.

FULTON (J. P.). **Aster yellows virus affecting Strawberries in Arkansas.**—*Plant Dis. Reptr*, **41**, 6, pp. 521–523, 1957.

A virus disease of strawberries in Arkansas [**34**, p. 233], now definitely attributed to aster yellows virus [cf. **32**, p. 683; **35**, p. 689], occurs most commonly in late July and Aug. The disease does not spread in the field and is of minor importance. Another similar virus, with a shorter incubation period (4 weeks) and different indicator host reactions, has been noted but not identified.

STOVER (R. H.). **Ecology and pathogenicity studies with two widely distributed types of Fusarium oxysporum f. cubense.**—Abs. in *Phytopathology*, **47**, 9, p. 535, 1957.

A yellow and a non-yellow type of *F.o.* f. *cubense* from bananas [in Honduras] are recognized, the former often associated with marked yellowing of erect leaves of mature plants, and the latter with leaf collapse attended by little or no yellowing. The two differ in culture. Only the yellow was highly virulent, causing 80% disease as opposed to 10% for the non-yellow. Field infection by artificial inoculation required high spore concentration in contact with the roots. Natural root invasion was always through secondary and tertiary roots, invasion near or at the root cap causing tissue discoloration before intracellular colonization. The fungus did not generally advance into the main root [**36**, p. 478].

Plants inoculated with yellow-type inoculum often yielded non-yellow cultures and *vice versa*, or both might be found in the same diseased pseudostem. The non-yellow predominated in pseudostems in young plantations, the yellow in some areas of older ones. Isolates from secondary roots of diseased, and of some healthy plants, were 80% the yellow strain.

ANDRADE (A. C.), PUZZI (D.), & TORRES (S. C. A.). **Experiências para o contrôle das podridões do engaço e pedicelo da Banana.** [Experiments for the control of Banana stem and pedicel rots.]—*Arq. Inst. biol., S. Paulo*, **23**, pp. 87–100, 1956. [English summary. Received Oct. 1957.]

A tabulated survey is given of the results of 3 experiments in the treatment of

bananas under storage conditions in São Paulo, Brazil, against *Thielaviopsis* [*Ceratocystis*] *paradoxa* [**36**, p. 255] and *Gloeosporium musarum*. Three shipments of fruit grown on the coastal lowlands of the State and destined for London were also used in the tests, the object of which was to determine the best method of application of shirlan WS, i.e., spraying the whole bunch, dipping, or spraying or brushing the cut stem only, in comparison with the standard treatment of brushing with vaseline+4% potassium permanganate, and also with brushing with prinzon and spraying with 2% dowicide A. Shirlan was used at various concentrations up to 1% with an admixture of 0·02% agral.

The best control was effected by spraying the entire bunch with 0·6% shirlan [cf. **28**, p. 512] soon after harvest. The superiority of this procedure is attributed to the residue left on the bunch by the fungicide, conferring protection against the injuries liable to occur in transit which would allow entry by *C. paradoxa* and *G. musarum*.

Castellani (E.). **Su alcune malattie da trasporto delle Banane.** [On some transport diseases of Bananas.]—*Progr. agric., Bologna*, **3**, 6, pp. 674–680, 6 fig., 5 graphs, 1957.

The gist of this paper on wastage by *Gloeosporium musarum* has already been noticed [**36**, p. 199].

Ruehle (G. D.) & Ledin (R. B.). **Mango growing in Florida.**—*Bull. Fla agric. Exp. Sta.* 574, 90 pp., 43 fig., 1955. [81 refs. Received 1957.]

Most of the information on diseases contained in this pamphlet (pp. 64–80) has already been noticed [**30**, p. 51]. Anthracnose (*Colletotrichum gloeosporioides*) [*Glomerella cingulata*] is still the most serious and widespread mango disease in Florida, but the incidence of scab (*Elsinoe mangiferae*) and powdery mildew (*Oidium* sp.) [**35**, p. 780] is increasing somewhat.

Cruickshank (I. A. M.). **Crown rust of Ryegrass.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 5, pp. 539–543, 1957.

Investigations at the Grasslands Division, Palmerston North, confirmed that perennial rye-grass (*Lolium perenne*) infected by *Puccinia coronata* is unpalatable to sheep [**20**, p. 471]. None of the 72 strains of perennial, Italian (*L. multiflorum*), or short-rotation (perennial × Italian) ryegrass tested in the glasshouse was immune from a New Zealand-wide collection of *P. coronata*. Short-rotation ryegrass progenies were highly resistant and *L. perenne* was highly susceptible, with the exception of one strain of Dutch origin (A. 1749). Italian ryegrass strains and the perennial × short-rotation progenies were intermediate.

Bruehl (G. W.), Toko (H.), & McKinney (H. H.). **Mosaic of Italian Ryegrass and Orchard Grass in western Washington.**—Abs. in *Phytopathology*, **47**, 9, p. 517, 1957.

A mosaic of *Lolium multiflorum* was with difficulty mechanically transmitted to the same and 3 other *L.* spp., *Dactylis glomerata*, *Festuca elatior*, oats, and wheat, symptoms ranging from strong and persistent to faint and transient. The latter type developed on 5 spp. of *Bromus* and *Hordeum leporinum*. A mosaic of orchard grass (*D. glomerata*) [cf. **36**, p. 191], apparently caused by the same virus, could not be transmitted by 3 species of aphid tested.

Williams (A. S.) & Taylor (L. H.). **Rathay's disease of Orchard Grass found in Virginia.**—*Plant Dis. Reptr*, **41**, 7, p. 598, 1 fig., 1957.

Corynebacterium rathayi has been identified on *Dactylis glomerata* in Virginia [cf. **25**, p. 118].

Watson (Alice J.). **A new rust for the West Indies.**—*Plant Dis. Reptr*, **41**, 6, p. 547, 1957.

The finding of the uredial stage of *Puccinia stenotaphri* on St. Augustine grass (*Stenotaphrum secundatum*) in Puerto Rico is apparently the first record of this rust in the Western Hemisphere.

Todd (E. H.). **Rust of St. Augustine grass in Florida.**—*Plant Dis. Reptr*, 41, 7, p. 650, 1957.

Puccinia stenotaphri on *Stenotaphrum secundatum* [see above] was observed in Florida in early 1957, a new record for the United States.

Lacoste (L.). **Champignons parasites et saprophytes de l'Alfa (Stipa tenacissima L.).** [Parasitic and saprophytic fungi on Esparto Grass (*Stipa tenacissima* L.).] —*Rev. Mycol., Paris*, **22**, *Suppl. colon.* 1, pp. 6–18, 12 fig., 1957.

In this preliminary paper descriptive notes are given on 6 ascomycetes (including 2 new species) and 6 fungi imperfecti (1 new) on *S. tenacissima* in Tunisia and Algeria [**35**, p. 126].

Kort (J.). **Inoculatie proeven met stengelbrand, Colletotrichum trifolii B. et E., in verschillende vlinderbloemige gewassen.** [Inoculation experiments with anthracnose, *Colletotrichum trifolii* B. & E., on various papilionaceous crops.] —*Versl. PlZiekt. Dienst Wageningen* 129 (*1955*), pp. 179–183, 1956. [English summary. Received Oct. 1957.]

Anthracnose (*C. trifolii*) is reported to be prevalent in the Netherlands on red clover and *Ornithopus sativus*. Positive results were obtained in inoculation experiments performed with spore suspensions on 11 Aug. 1954, on the 2 natural hosts and 9 of 15 legumes, viz., crimson clover, *Medicago lupulina*, *Melilotus alba*, lucerne, common vetch, *Vicia villosa*, sweet and bitter yellow lupins, and blue lupins; white, hybrid, and subterranean clovers and *Lotus corniculatus* were immune. The reactions of the experimental hosts are briefly described. Control may be effected by early mowing of perennials, before the field becomes infested by diseased fallen leaves and stem residues left on the ground. Thus, the regrowth of red clover, lucerne, and *M. alba* mown on 22 Sept. was found to be largely healthy a month later.

Sherwood (R. T.). **Physiologic races of the Red Clover leaf rust fungus.**—*Phytopathology*, **47**, 8, pp. 495–498, 1 fig., 1957.

At Cornell University 5 physiologic races of *Uromyces trifolii* var. *fallens* [**15**, p. 810; **34**, pp. 302, 438] were detected. Of 15 lines of the fungus collected from 14 places in northern U.S., 9 were from single uredospores and 6 from single pustules; in addition there were 5 unpurified 'bulk' lines. Detached, inoculated leaflets were floated on a 2% sucrose solution at 20–22° C. under continuous fluorescent light of 130–185 ft. candles, which kept them green and free from moulds for some 3 weeks. Their reactions were shown to be well correlated with those of whole plants. Alternatively, whole plants were used on which artificial dew formation had been induced.

Commercial varieties of red clover proved unsuitable for distinguishing races of the rust; common Oregon and Purdue were completely susceptible, but Altaswede, Pennscott, and some other varieties proved heterogeneous for resistance and susceptibility, and individual plants from certain selected varieties, which showed consistent immunity or susceptibility to the rust, proved well suited for this purpose. The geographic origin of the races is tabulated.

Malmus (N.). **Zur Frage der Verhütung der Auswinterung durch Kleekrebs.** [On the question of the prevention of winter injury by Clover rot.]—*Pflanzenschutz*, **9**, 8, pp. 107–109, 1957.

In experiments in Bavaria during 1956–7 to determine the relative efficiency of

various chemical soil treatments for the control of *Sclerotinia trifoliorum* (which was estimated in 1947–8 to have caused damage representing a loss of DM. 10,000,000) the best results were obtained with brassicol super [cf. **36**, p. 692], applied on 25 Oct. at 35 kg./ha., which increased the yield by 80%. It is suggested that in areas where the fungus causes winter injury in 8 years out of 10, entailing a loss of DM. 200/ha., an outlay on treatment of up to DM. 80/ha. would be worth while.

FEZER (K. D.). **A study of factors that influence survival of Red Clover, with special reference to root rots.**—*Diss. Abstr.*, **17**, 5, p. 939, 1957.

At Cornell University the fungi most frequently isolated from diseased roots of red clover [cf. **33**, p. 192] were *Fusarium solani*, *F. oxysporum*, and *Gliocladium* sp., in that order. *F. solani* was pathogenic to seedlings and to both young and mature plants; it seems probable that all these fungi contribute to failure of red clover to survive more than 2 years in commercial fields in New York State. In the greenhouse treatments which weakened the plants (clipping at short intervals, short day conditions, and K/P imbalance) favoured the development of tap root infection. The observation that plants persisted longer in field plots fumigated with methyl bromide was taken to indicate that fungal attack following nematode injury is a factor in the non-survival of the stand. Partial control of foliage insect pests and diseases by insecticidal and fungicidal sprays did not improve stand persistence.

ROBERTS (D. A.). **Observations on the influence of weather conditions upon severity of some diseases of Alfalfa and Red Clover.**—*Phytopathology*, **47**, 10, pp. 626–628, 1957.

From observations at Cornell University on leaf spot (*Pseudopeziza medicaginis*) and black stem (*Ascochyta imperfecta*) of lucerne and leaf spot (*P. trifolii*) [**35**, p. 828] and northern anthracnose (*Kabatiella caulivora*) [**36**, p. 594] of red clover in central New York State during 1952–56 it is concluded that *A. imperfecta* and *K. caulivora* are likely to become epiphytotic before the first hay harvest if rainfall in the preceding autumn insures abundant production of inoculum, the temp. in Mar.–May is near normal, and there are about 20 days with at least 0·01 in. rainfall in May. With only 10 or less days of measurable May rainfall, these diseases are in general mild. If mean temps. for Mar., Apr., and May do not exceed 28, 41, and 51° F. the *P.* leaf spots are likely to be mild, but they are more severe if the temps. approach 34, 46, and 57°.

ATHOW (K. L.). **The effect of seed treatment on seedling stand and forage yield of Alfalfa and Red Clover.**—*Phytopathology*, **47**, 8, pp. 504–506, 1957.

The advisability of chemical treatment of seed of lucerne and red clover [**35**, p. 528] was investigated at Purdue University, Lafayette, Indiana during 1952–56. The results confirmed others obtained elsewhere and indicated that no worthwhile benefit was to be obtained from seed treatment.

VITA-FINZI (GISELLA). **Studio sperimentale di una virosi del Trifolium repens prodotta dal virus del mosaico dell' Erba medica.** [An experimental study of a virosis of *Trifolium repens* produced by Lucerne mosaic virus.]—*Ann. Sper. agr.*, N.S., **11**, 4, pp. 925–957, 14 fig., 1957. [English summary.]

A full account is given of studies at the University of Milan, Italy, on a disease of clover (*T. repens*) caused by lucerne mosaic virus, found to be widespread in northern Italy [cf. **36**, p. 408]. Inoculations to tobacco and thence to French bean (*Phaseolus vulgaris*) showed the virus to be present in *T. pratense* from Bressanone, endive and *Chenopodium album* from Milan, and eggplant and *Solanum nigrum* from Rovigo.

Diachun (S.) & Henson (L.). **Mechanical and natural transmission of a yellow strain of Alfalfa mosaic virus to clones of Atlantic Alfalfa.**—Abs. in *Phytopathology*, **47**, 9, pp. 518–519, 1957.

A strain of lucerne mosaic virus causing yellowing, blotching, and stunting symptoms proved mechanically transmissible to 73 of 100 clones, and field transmissible in 1956–7 to 57 of these clones; symptom expression varied in extent, but in general was less in cool weather and more prominent in the summer. This strain should facilitate observations on natural spread of the virus and selection for tolerance or resistance.

Hawn (E. J.). **Studies on crown bud rot of Alfalfa in southern Alberta.**—*Diss. Abstr.*, **17**, 5, pp. 939–940, 1957.

Crown bud rot of lucerne is widespread in irrigated stands in Alberta [**32**, p. 486]. Stands 1, 2, 3, and 4 years of age contained 20·7, 79·7, 98·5, and 100% infected plants, respectively, the reduction in numbers of healthy crown buds averaging 4, 19, 37, and 43%. Detailed surveys and monthly sampling of field plots showed that the main advance of the disease in each year occurs during the first month of active growth, being most pronounced in 2- and 3-year stands. Temperatures above 16° C. arrest the development of the disease. Of the isolates from affected crowns the most pathogenic to crown buds were *Rhizoctonia* [*Corticium*] *solani*, *Fusarium avenaceum*, *F. acuminatum*, and *Ascochyta imperfecta*, in descending order. *F. acuminatum* was the predominant isolate until the 3rd year when its numbers were approximately equalled by *C. solani*, after which the latter declined again, perhaps under the influence of *Trichoderma* and *Penicillium* spp. This decline coincided with a reduction in the rate of development of the disease. *F. acuminatum* appears to be equally active throughout the growing season, whereas *C. solani* generally appears most frequently in summer samples and *A. imperfecta* in the spring.

Eight varieties of *Medicago media* and 6 of *M. falcata* all proved susceptible. Brassicol and 8-hydroxyquinoline sulphate gave partial control in the field for a short time.

Wagner (F.). **Zum Problem der Luzernewelke auf Grund mykologischer Untersuchung der Wurzeln.** [Contribution to the Lucerne wilt problem on the basis of a mycological study of the roots.]—*Pflanzenschutz*, **9**, 8, pp. 109–110, 1957.

At the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, 51 of 731 lucerne root fragments (6·95%) cultured on nutrient agar media yielded *Verticillium albo-atrum* [**17**, p. 754; cf. **21**, p. 336], 27 (3·69) *Ascochyta imperfecta* [loc. cit., **33**, p. 486], 12 (1·64) *Cylindrocarpon* spp., 202 (27·31) *Fusarium* spp., 20 (2·73) unidentified or sterile mycelia, and 238 (32·55) bacteria, while the remaining 191 were free from infection. These statistics, however, must be interpreted with caution. For instance, the high proportion of bacteria does not connote primary infection of the roots by these organisms. On the other hand, their activity was so great as almost completely to suppress the growth of fungi, especially *V. albo-atrum* and *A. imperfecta*, in the cultures, and in not a few cases the bacteria produced antagonistic substances, preventing the development of *F.* spp., of which at least 8 were represented and probably partially responsible for the wilt.

The composition of the fungal population of the roots did not remain constant during the periods covered by the investigation. Thus, from the end of Oct. to the end of Nov. 1956, *F.* spp. were absent. During the following Apr. and May *V. albo-atrum*, *A. imperfecta*, *F.* spp., and *C.* spp. were all present. The *C.* spp. disappeared at the end of May, *A. imperfecta* at the beginning of June, and *V. albo-atrum* during the same month.

The macroscopically visible discolorations of the vascular bundles and cambium

in wilted lucerne plants proved not to be an infallible indication of the presence of a pathogen, while conversely, *V. albo-atrum* and *A. imperfecta* were frequently isolated from externally sound material. The vascular bundle discolorations, unlike those of the cambium, tend to vanish and then reappear, sometimes in a new position. They generally originate in small lateral roots and pass thence to the main stem. No etiological connexion could be traced between the tint of the discolorations, which are mostly brown, seldom definitely black, and the results of the mycological studies.

ERWIN (D. C.) & KENNEDY (B. W.). **Studies on Phytophthora root rot of Alfalfa.**—Abs. in *Phytopathology*, **47**, 9, p. 520, 1957.

Root rot of lucerne seedlings in California, due to *P. cryptogea* [**36**, p. 248], was at a maximum, in greenhouse experiments, at soil temps. of 22 and 27° C., very little occurred at 17°, and none at 32°. *Cicer arietinum* and *Sesbania* sp. also proved susceptible. Zoospores, obtained by incubating infected lucerne stems in aerated ½-strength Hoagland's solution for 15–30 hr., were the best inoculum. The var. Lahontan showed some tolerance.

CORMACK (M. W.), PEAKE (R. W.), & DOWNEY (B. K.). **Studies on methods and materials for testing Alfalfa for resistance to bacterial wilt.**—*Canad. J. Pl. Sci.* (formerly *Canad. J. agric. Sci.*), **37**, 1, pp. 1–11, 2 fig., 2 graphs, 1957.

At the Plant Pathology Laboratory, Lethbridge, Alberta, all the methods tested for inoculating the roots or crowns of lucerne with *Corynebacterium insidiosum* [**35**, p. 896] gave good results. Particularly rapid and effective for greenhouse tests was the method by which the root-ball from a pot of 10–20 plants was cut through 2 in. below the soil surface, the lower part returned to the pot and submerged in a suspension of inoculum, and the upper part replaced on top. In the field the best results were obtained with bare-root soak inoculation [cf. **32**, p. 193] before transplanting and a hypodermic injection of the roots in the autumn, the two combined being effective for rigid elimination of susceptible plants. Spraying and other methods of stem inoculation proved unreliable.

Culture inoculum and that prepared from diseased plants were equally effective but the latter was easier to handle and store, remaining viable for 3 years at room temperature, 5, and −20° C., and automatically providing a mixture of all strains present. Pulverized plant inoculum was most efficient when soaked in water for 4 to 12 hr. before use, longer soaking periods gradually inactivating it. If a highly standardized inoculum is required, cultures of tested virulence are preferable but a mixture of several isolates is necessary. Great care is required to maintain cultures in a virulent condition.

The age and type of plant used were found to be important. Lucerne seedlings should be at least 2 months old and rooted cuttings even older before inoculation. In Grimm lucerne, inoculated in the greenhouse at 3–10 weeks, infection increased progressively with age, maximum susceptibility at 7–10 weeks being associated with the extensive formation of secondary tissues in the root and crown. Disease development was usually more rapid in seedlings than in clonal material.

THEIS (T.), FREYRE (R. H.), & KENNARD (W. C.). **Pellicularia filamentosa on Tephrosia vogelii and Cajanus indicus in Puerto Rico.**—*F.A.O. Pl. Prot. Bull.*, **5**, 10, pp. 159–160, 1 fig., 1957.

During the rainy season of 1956, plots of *T. vogelii* at the Federal Research Station, Mayaguez, Puerto Rico, were attacked by *P. filamentosa* [*Corticium solani*: **33**, p. 383], which caused defoliation and death of the young parts of the stems. A disease caused by the same species occurred in an adjoining plot of pigeon peas, and the fungi were found to be cross-pathogenic. *Hevea* rubber trees were also

growing in the vicinity [cf. **29**, p. 329]. Control was obtained by spraying twice weekly with Bordeaux mixture and zinc bisdithiocarbamate [zineb] alternately, until the advent of dry weather.

SINGH (B.) & SINGH (R. S.). **Temperature and moisture relations of the fungi causing seedling-rot, root-rot and wilt of Cyamopsis psoralioides DC. 1. Effect of temperature on the growth of fungi in artificial media. 2. Effect of soil moisture on mortality under controlled conditions.**—*Agra Univ. J. Res.* (*Sci.*), **5**, 1, pp. 135–141, 2 pl., 1956. [Received 1957.]

Further studies at the Government Agricultural College, Kanpur, India, established that *Rhizoctonia* [*Corticium*] *solani*, causing root rot, and *Fusarium caeruleum* wilt [**35**, pp. 682, 683] of *Cyamopsis psoraloides* grew best in artificial media at 28–30° and 26–28° C., respectively. Pre- and post-emergence losses due to *Corticium solani* occurred at 15–60% soil moisture (opt. above 30%, the corresponding figure for *F. caeruleum* being 25–30%). A combination of the two fungi was almost equally severe throughout the range 15–60%. At 20% *C. solani* produced local necrosis of the hypocotyl and roots; at higher levels it caused rotting of the root or whole seedling.

HORNER (C. E.) & MAIER (C. R.). **Antibiotics eliminate systemic downy mildew from Hops.**—Abs. in *Phytopathology*, **47**, 9, p. 525, 1957.

Streptomycin (agristrep), most effectively applied in Oregon during rapid vegetative growth of hops, at 1,000, 3,000, and 5,000 p.p.m., transformed 16, 71, and 100% of hop shoots systemically infected by *Pseudoperonospora humuli* [cf. **37**, p. 51] into healthy shoots. In another trial a greater volume of streptomycin spray at 0, 250, 500, 750, 1,000, 1,500, and 2,000 p.p.m. resulted in 91, 69, 59, 34, 11, 9, and 3 hills remaining infected. Dust was ineffective. Griseofulvin spray applied at 500 or 1,000 p.p.m. to basal shoots eliminated production of systemically infected shoots for the subsequent growing season and in the following year the 300 treated hills had 20 infected shoots compared with 141 in the controls.

MAIER (C. R.) & HORNER (C. E.). **Absorption and translocation of streptomycin by Hops.**—Abs. in *Phytopathology*, **47**, 9, p. 528, 1957.

Streptomycin sulphate (agristrep) and nitrate (phytomycin) applied in lanolin paste to the 1st node of hop stems were readily absorbed and translocated. Leaves 4–10 cm. above the treated node contained 76 p.p.m. streptomycin sulphate and 81 p.p.m. nitrate 30 min. after application. The sulphate attained a mean concentration of 46 p.p.m. after 24 hr., the nitrate 37 p.p.m. after 15 hr. Both declined to 2·5 p.p.m. after 72 hr., but persisted at 1·2 p.p.m. after 12 days.

WILSON (J. F.). **Whitbread's Golding variety Hop: a note on wilt tolerance in the field and the establishment of a Verticillium-free planting stock.**—*Rep. E. Malling Res. Sta., 1956*, pp. 128–130, 1 fig., 1957.

A description is given of Whitbread's Golding hop, originally bred in 1911 and known as variety '1147' until 1956. A field survey showed the tolerance of wilt (*V. albo-atrum*) [**37**, p. 51] of this variety to be equal to that of Keyworth's Mid-season and Keyworth's Early. *Verticillium*-free stock is being distributed commercially.

CHRISTIE (T.). **A black rot of the Hop plant.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 6, pp. 647–648, 1 fig., 1957.

In inoculation experiments at the Cawthron Institute, Nelson, New Zealand, *Gibberella pulicaris* var. *minor*, often occurring above ground on the base of bines of hop plants killed by *Phytophthora cactorum* [**36**, p. 211], was by itself able to cause a black rot of the tissues and death of dormant cuttings.

SKOTLAND (C. B.) & MENZIES (J. D.). **Two Peppermint diseases found in the Yakima valley of Washington.**—*Plant Dis. Reptr*, **41**, 5, p. 493, 1957.

The typical mint strain of *Verticillium albo-atrum* [*V.a.* var. *menthae*: **31**, p. 576] is recorded on peppermint for the first time in Washington. *Sclerotinia sclerotiorum* caused considerable damage to peppermint in a small area, this apparently being a new host record.

GREEN (R. J.). **The vertical distribution of Verticillium albo-atrum in muck soils and its control.**—Abs. in *Phytopathology*, **47**, 9, p. 522, 1957.

Experiments related to the control of wilt of peppermint and spearmint (*Mentha cardiaca*) [in the U.S.A.], namely, the planting of root cuttings of susceptible peppermint in soil samples taken from different depths, showed that infection by *V. albo-atrum* decreased from 97·2% in the top 6-in. sample to 0 in the 18–24-in., 4·5% in the 24–30-in., and 0 in the 30–36-in. samples. Using suitable machinery to plough to 30–32 in. and invert the muck soil concerned, wilt was reduced to 4% on the area so treated, compared with 57·5% on that ploughed conventionally.

MOHANTY (N. N.) & ADDY (S. K.). **Cercospora leaf spot of Rauwolfia serpentina Benth.**—*Curr. Sci.*, **26**, 9, pp. 289–290, 1 fig., 1957.

R. serpentina at the State Agricultural Research Station, Bhuhaneswar (Orissa), India, was severely attacked in 1956 by a leaf-spot disease caused by *C. rauwolfiae* [see below]. Minute, yellowish discolorations increase in size and turn dark brown on the upper surface of the leaf and yellowish brown on the lower. The affected leaves turn yellow, dry, and fall.

CHANDRA (V.). **Leaf blotch disease of Rauwolfia serpentina Benth.**—*Sci. & Cult.*, **23**, 2, p. 99, 1957.

At the National Botanic Gardens, Lucknow, a large number of *R. serpentina* plants developed purple-madder blotches on the leaves due to *Cercospora* sp. [see above]. The blotches were irregularly distributed and appeared during July, Aug., and Sept. The colour changes to maroon with age and the whole leaf dries. Collecting and destroying the diseased leaves is recommended to control disease spread.

ABRAHAM (P.). **Now, better possibilities with Cardamom.**—*Plant Chron.*, **52**, 3, pp. 65–73, 1957.

This general account of the cultivation of cardamoms (*Elettaria cardamomum*) in India refers to the 'katte' or mosaic virus disease [**35**, p. 282], the most serious disease of the crop, which appears as a pale mottling and curling of the young leaves and dwarfing of new shoots, followed by the death of the clump. Roguing affected plants is the only means of control. The disease is not seed transmissible, so for new plantings seed should be used rather than rhizomes. Another serious disease is clump rot caused by *Pythium* sp., which can be checked by the application (3 oz./clump) of ammonium phosphate, superphosphate, or lime.

PUTT (E. D.) & SACKSTON (W. E.). **Studies on Sunflower rust. I. Some sources of rust resistance.**—*Canad. J. Pl. Sci.* (formerly *Canad. J. agric. Sci.*), **37**, 1, pp. 43–54, 1957.

Most of this information on resistance in sunflowers to rust (*Puccinia helianthi*) has already been noticed [**34**, p. 652].

ROBERTSON (J. S.) & BULL (R. A.). **The blast disease of Oil Palm seedlings.**—*Bull. agron. Fr. d'out. mer* 14 (*1956*), pp. 193–198, 4 graphs, 1957.

This information on the blast disease of oil palm seedlings in West Africa has already been noticed [**35**, p. 448; **36**, p. 468, *et passim*].

Dupriez (G.) & Brédas (J.). **Pépinières d'Elaeis.** [*Elaeis* nurseries.]—*Bull. Inform. Inst. Étud. agron. Congo belge*, **6**, 4, pp. 205–225, 6 fig., 1957.

In oil palm nurseries in the Belgian Congo leaf spot (*Helminthosporium halodes*) [cf. **34**, p. 643] is very successfully controlled by spraying both leaf surfaces with a 0·5% solution of a wettable powder containing 50% captan. Treatment should be applied preventively directly the wet season starts and repeated every 2 weeks.

Phytophthora-Prognose-Konferenz am 10. und 11. Dezember 1956 in Braunschweig. [*Phytophthora* prognosis conference at Brunswick, 10 and 11 December 1956.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **9**, 3, p. 46, 1957.

In this very brief report J. Ullrich outlines the work of this conference, at which meteorologists and plant pathologists from Ireland, Holland, and Germany discussed the problems of forecasting potato blight [*P. infestans*: **36**, p. 493]. The importance of localized forecasting was stressed.

In the section on test-plot studies J. J. Post reported work in Holland and Jugoslavia in 1956 in which the progress of infection was studied in round plots enclosing an introduced focus of infection. S. Uhlig described a co-operative study carried out in 18 localities in Germany in which the development of infection was observed in square plots with no introduced source of infection. It was decided to use both of these methods in an international co-operative study in 1957.

A number of papers was presented in the 3rd section on the practical aspects of forecasting on the basis of macro- and micro-climatic data.

Ullrich (J.). **Die Biologie und Epidemiologie von Phytophthora infestans (Mont.) de By.** [The biology and epidemiology of *Phytophthora infestans* (Mont.) de Bary.]—*NachrBl. dtsch. PflSchDienst* (*Braunschweig*), *Stuttgart*, **9**, 9, pp. 129–138, 1957. [107 refs.]

This contribution from the Institut für Physiologische Botanik, Brunswick, is a detailed review of potato blight from the literature.

Rosser (W. R.). **Potato blight control trials in the West Midland Province, 1950–54.**—*Plant Path.*, **6**, 3, pp. 77–84, 20 graphs, 1957.

Spraying trials were carried out during 1950–54 in Cheshire, Shropshire, Staffordshire, Warwickshire, and Worcestershire against *Phytophthora infestans*. The treatments were: (1) control, no protective spraying and no haulm destruction; (2) protective copper spraying only; (3) protective spraying with haulm destruction 2 weeks before lifting; and haulm destruction only, (4) by mid-Aug. in 1951–54, and when blight was 25% on haulm in 1950, (5) at about the end of Aug., or (6) in late Sept., as in (3). The spraying was carried out with a proprietary fungicide, mostly copper oxychloride (50% Cu), at 5 lb./100 gal., applied at least at 100 gal./acre. As practicable, the first spray was timed on the occurrence of a Beaumont period. Haulms were destroyed with sodium chlorate (30 lb./100 gal.) applied at at least 100 gal./acre. Except at 1 centre in 1 season King Edward potatoes were used throughout. At every centre every year some blight was present on the haulms in Sept.

The results showed that, despite an appreciable and fairly constant reduction in blighted tubers, routine protective spraying carried out every year, even on King Edward, is not economic in the area [cf. **33**, p. 251]. In years when blight is severe, however, efficient and well-timed spraying may result in a gain of 2 tons of healthy tubers/acre.

It is concluded that in those few districts and seasons when infection reaches the 75% stage by the end of Aug. the loss on unsprayed King Edward may average 9–13% of the potential total yield. (The trial spraying was done by hand, with no

loss by wheel damage, which can amount to 4% of the potential crop, even with a 13-row sprayer [cf. **34**, p. 172].)

While haulm destruction in early Aug. reduced the mean weight of blighted tubers from about 13 to about 5 cwt./acre, this reduction was obtained at the expense of a loss of about 4 tons/acre of the mean total crop and is entirely uneconomic. Haulm destruction at the end of Aug. reduced the mean weight of blighted tubers from about 13 to about 8 cwt./acre, but with a mean crop loss of about 1 ton/acre. Haulm destruction in mid-Sept. caused no significant reduction in total yield or in weight of blighted tubers and would appear to be of more value for clearing the ground before lifting than for blight control.

Richardson (D. E.) & Doling (D. A.). **Potato blight and leaf roll virus.**—*Nature, Lond.*, **180**, 4591, pp. 866–867, 1957.

At the National Institute of Agricultural Botany, Cambridge, it was noted in the field that Ulster Supreme potatoes with symptoms of leaf roll were preferentially attacked by *Phytophthora infestans*. In the laboratory, however, virus infected leaf pieces proved less susceptible to blight when sprayed with zoospore suspensions, and the spread of the fungus in them was slower than in leaflets without virus. The rolled leaves are more retentive of rain, providing a microclimate particularly favourable to infection.

Tomiyama (K.), Takakuwa (M.), Takase (N.), & Sakai (R.). **Physiological studies on the defence reaction of Potato plant to the infection of Phytophthora infestans. III and IV. The influence of pre-infection ethanol narcosis upon the physiological reaction of Potato tuber to the infection of P. infestans.**—*Ann. phytopath. Soc. Japan*, **21**, 1, pp. 17–22, 1 fig.; 4, pp. 153–158, 1 fig., 1956. [Japanese. Abs. from English summaries. Received Oct. 1957.]

In further work at Hokkaido Agricultural Experiment Station, Japan [cf. **35**, p. 842; **36**, p. 549], halves of potato tubers of the resistant 41089–8 were immersed in ethanol for 10 min. and inoculated with the common Japanese H_1 strain (race 0) of *P. infestans*. The reaction of the narcotized tissue to infection was inhibited in comparison with the reaction of untreated halves, in which *P. infestans* induced an increase in respiration rate, water-soluble protein, and polyphenol content.

From a study of the oxygen uptake of ethanol-treated, cut potato tubers it was concluded that the ethanol inhibits the respiratory enzyme system, with a consequent lowering of the metabolic activity, and could be detected in the tissue for 2 days after treatment. This period coincided with the length of time during which the resistance of the tubers to *P. infestans* was lowered.

Tomiyama (K.). **Cell physiological studies on the resistance of Potato plants to Phytophthora infestans. IV. On the movements of cytoplasm of the host cell induced by the invasion of Phytophthora infestans.**—*Ann. phytopath. Soc. Japan*, **21**, 2–3, pp. 54–62, 1 fig., 2 diag., 4 graphs, 1956. [Japanese summary. Received Oct. 1957.]

In this further contribution [**35**, p. 493 and below] it is reported that in living midrib cells of young potato leaflets of the highly resistant var. 41089–8 the acceleration of protoplasmic movement following infection by zoospores of *P. infestans*, races H_1 (race 0) and H_3 (race 1), was more rapid than in the susceptible Hokkai No. 9. Streaming towards the site of infection may be associated with increased metabolism in infected tissue.

Takakuwa (M.) & Tomiyama (K.). **Cell physiological studies on resistance of Potato plants to Phytophthora infestans. VI. The time required for the browning process of midrib cells induced by the infection with two different pathogenic strains of Phytophthora infestans in Potatoes.**—*Res. Bull. Hokkaido nat. agric.*

Exp. Sta. 73, pp. 94–99, 2 graphs, 1957. [Japanese. Abs. from English summary.]

In further studies in this series [see above] detached leaves of the hybrid Hokkai No. 10 (R_1) showed a hypersensitive reaction when inoculated with race 0 of *P. infestans* but were susceptible to race 1.

Yamamoto (M.) & Ozoe (M.). **Studies on the change of pathogenicity of Phytophthora infestans caused by passing through the Potato varieties of different susceptibility.**—*Ann. phytopath. Soc. Japan*, **21**, 2–3, pp. 63–67, 1956. [Japanese. Abs. from English summary. Received Oct. 1957.]

At Shimane Agricultural College, Japan, the virulence of *P. infestans* [see above] to the resistant potato hybrid 42044–15 was increased by passing it through the susceptible Irish Cobbler. It was concluded that virulence was dependent on the susceptibility of the variety from which the strain was last obtained.

Elarosi (H.). **Fungal associations. I. Synergistic relation between Rhizoctonia solani Kühn and Fusarium solani Snyder and Hansen in causing a Potato tuber rot. II. Cultural studies on Rhizoctonia solani Kuhn, Fusarium solani Snyder and Hansen, and other fungi, and their interactions.**—*Ann. Bot., Lond.*, N.S., **21**, 84, pp. 555–567; 569–585, 4 pl., 10 fig., 1 diag., 1 graph, 1957.

At the University of Manchester inoculation of King Edward and Majestic potato tubers with *R.* [*Corticium*] *solani*, followed after 1 month by *F. solani*, caused extensive rotting, occasionally accompanied by external, pimple-like formations. This type of rotting was not induced by individual infections by either fungus, or by both jointly when *F. solani* was used first. *C. solani*, inoculated alone, grew intracellularly, but both inter- and intracellularly in the successive double infection. *F. solani* formed more haustorium-like structures when inoculated alone than when following *C. solani*, and in the double infection the length of these structures was greater in mature than in young tubers. Most rotting occurred at 94% R.H. in the rose-end and at 94–100% R.H. in the stem-end and in the half-way position; the shape and colour of the rot, and the morphology of the fungus in the tissues [**35**, p. 631] were also affected by R.H.

A potato mash medium on which *C. solani* had been grown gave better growth subsequently of *C. solani* and *F. solani* than one initially used by *F. solani*, and this was so whether the reaction of the spent medium was readjusted or not. The medium used by *F. solani* appears to contain a thermostable factor (or factors) affecting the susequent growth of both fungi.

The pH range for growth of *C. solani* was narrower than that for *F. solani*, the opt. being 5·9 and 7·8, respectively. In mixed cultures on potato dextrose agar adjusted to different pH values the fungus for which the reaction was the more suitable usually became predominant.

On a pectin-agar medium the growth of a *C. solani* colony was poor but increased in the sector adjacent to a colony of *F. solani*; after the two fungi had come into contact growth of *C. solani* was most rapid round the *F. solani* colony. On a synthetic liquid medium with pectin as the carbon source growth of *C. solani* was improved more by the addition of a medium used by *F. solani* than by one used by *C. solani*. *C. solani* showed partial deficiencies for thiamine, biotin, and inositol. Both the extract of *F. solani* mycelium, grown on vitamin-free medium, and the used *F. solani* medium stimulated the growth of *C. solani* without vitamins.

Richardson (L. T.). **Quantitative determination of viability of Potato ring rot bacteria following storage, heat, and gas treatments.**—*Canad. J. Bot.*, **35**, 5, pp. 647–656, 5 graphs, 1957.

At the Science Service Laboratory, London, Ontario, the viability of the potato

ring rot bacterium (*Corynebacterium sepedonicum*) [**36**, p. 719] was determined quantitatively from the lag period in a time–growth curve based on turbidity development in a transparent liquid medium (yeast extract, 1 g.; casein hydrolyzate, 1 g.; dextrose, 1 g.; calcium pantothenate, 0·1 g.; water, 1,000 ml.). The test materials were glass or jute fibres on which a drop of bacterial suspension was dried. On dry jute *C. sepedonicum* survived 6 months' storage at 0° C. with no loss in viability. Some bacteria survived 6 months at 28°. The thermal death points for 10-min. exposures were 55° in a liquid medium, 125° in dry air on glass, and 150° in dry air on jute fibres. The minimum lethal gas dose was 2% ethylene oxide or 20% methyl bromide for 18 hr. for bacteria on dry jute fibres.

WEBB (R. E.) & SCHULTZ (E. J.). **Preliminary studies on corky ringspot of Potato.**—*Amer. Potato J.*, **34**, 7, pp. 193–199, 5 fig., 1957.

At the U.S. Dept Agric., Beltsville, Maryland, most tubers of the potato variety Sebago, affected by corky ringspot [spraing: cf. **36**, p. 808] and planted in the greenhouse, produced apparently healthy plants. However, 4 whole tubers and 9 seedpieces produced moderately to severely dwarfed plants with small, deformed, leathery leaves mottled with yellowish blotches and occasionally exhibiting small necrotic lesions. Necrotic stem streaking was seen, particularly in and near the nodes, and 2 plants died after exhibiting systemic leaf and stem necrosis. One affected tuber produced a diseased and an apparently healthy plant. The diseased plants from affected tubers produced tubers with skin cracking and brown areas of necrosis extending from the surface deep into the flesh. Sub-epidermal necrotic areas were visible through the skin and necrotic areas occurred throughout the flesh. One or more unidentified viruses were detected by grafting, in addition to a moderately virulent strain of potato virus X, identified by inoculation.

OSWALD (J. W.) & LORENZ (O. A.). **Potassium and internal black spot of Potato in California.**—Abs. in *Phytopathology*, **47**, 9, p. 530, 1957.

Black spot of Russet Burbank potatoes [cf. **33**, p. 558] is apparently associated with K nutrition. Figures are presented showing that as the K level of 80-day-old haulms falls below 9·5–10%, so the percentage of black spot increases. Dressings of 600 lb. K/acre in affected fields were not sufficient to obtain this level.

JOHNSON (G.) & SCHAAL (L. A.). **Accumulation of phenolic substances and ascorbic acid in Potato tuber tissue upon injury and their possible role in disease resistance.**—*Amer. Potato J.*, **34**, 7, pp. 200–209, 3 fig., 4 graphs, 1957.

At Colorado Agricultural Experiment Station, Fort Collins, chlorogenic acid and other *o*-dihydricphenols [**36**, p. 719] accumulated rapidly near the cut surface of potato tuber slices held at room temperature in a moist chamber. The rate of accumulation was decreased by maintaining the slices at 35° F., dipping in resorcinol or sodium bisulphite-sodium chloride solution, or immersing tubers in water at room temperature for 24 hr. before slicing. These substances were found to accumulate also in the necrotic areas of tubers affected by aster yellows [virus]. Ascorbic acid also accumulated in the slices but rapidly decreased after the 2nd day at room temperature. The authors consider that the accumulation of phenolic compounds following disease-induced injury may be an expression of a resistance mechanism [cf. **34**, p. 247; **35**, p. 863].

KASSANIS (B.). **The use of tissue cultures to produce virus-free clones from infected Potato varieties.**—*Ann. appl. Biol.*, **45**, 3, pp. 422–427, 1 pl., 1957.

In this expanded account of work already noticed [**36**, p. 812] it is stated that although growing the excised apical meristems of virus-infected potato sprouts produced plants free from potato paracrinkle virus and potato virus S, it failed to

produce plants free from potato virus X. This virus, however, appears not to be present in apical meristems, for no virus could be demonstrated in callus tissue developed from excised meristems under 200 μ across. The concentration of tobacco mosaic virus in tomato roots and tobacco stems was ascertained to be much less near the growing point than in older cells, but no evidence was obtained that the meristem is virus-free.

THOMSON (A. D.). **Elimination of Potato virus Y from a Potato variety.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 5, pp. 482–490, 3 fig., 1957.

At the Crop Research Division, D.S.I.R., Lincoln, New Zealand, potato virus Y was eliminated from Aucklander Short Top by excising the apical region of etiolated shoots, either with or without prior heat treatment (30, 35, or 38° C. for up to 23 days in the dark) [cf. **36**, p. 306]. The highest percentage of virus Y-free plants was obtained by establishing etiolated shoot apices in culture and then heat treating. None of the treatments eliminated potato virus X from Aucklander Short Top or Dakota; plants free from Y and infected with an avirulent strain of X may be the most satisfactory that can be obtained. Such plants in a preliminary glasshouse experiment gave a somewhat greater yield than those infected by X+Y.

KATO (M.). **Recovery of Y-virus by aphids from infected Potato plants.**—*Bull. nat. Inst. agric. Sci., Tokyo*, Ser. C, *1957*, 7, pp. 65–88, 3 fig., 1957. [Japanese. Abs. from English summary.]

Potato virus Y [**33**, p. 313] was not recoverable from inoculated potato plants by [unspecified] aphids until symptoms became evident. Recovery was easier from leaves with mosaic symptoms than from those with streak. The virus moved from the inoculated leaf into the stem 5 or 6 days after inoculation, after 7 days into the upper leaves, and after 7–10 days into the roots. No virus was detected in the eyes of tubers lifted 7 days after inoculation, but in those lifted after 30 days every eye was infected. The first virus symptoms (vein-clearing) were apparent in sprouts from infected tubers 4–5 days after emergence from the soil.

RAYMER (W. B.) & MILBRATH (J. A.). **A local-lesion test for Potato virus A in the presence of Potato virus X.**—Abs. in *Phytopathology*, **47**, 9, p. 532, 1957.

Köhler's 'A6' virus-free clone of *Solanum demissum*×*S. tuberosum* var. *aquila* gives somewhat similar lesions on inoculation with potato viruses A and X alone or together, but if inoculated with virus X and allowed to become systemically infected, the plants from the resulting tubers form no lesions on inoculation with virus X, but with virus A alone or combined with virus X they form lesions characteristic of virus A.

WILLIAMS (W. L.) & ROSS (A. F.). **Acquisition and test feeding periods required on Physalis floridana and Datura stramonium for aphid transmission of Potato leafroll virus. Aphid transmission of Potato leafroll virus as affected by the feeding of non viruliferous aphids on the test plants and by vector variability.**—Abs. in *Phytopathology*, **47**, 9, p. 538, 1957.

In the 1st abstract some data are presented on experiments with *Myzus persicae*. Failure to obtain transmission to *D. stramonium* with short acquisition and test feeding periods is apparently due to relative resistance of this host to small doses of the virus.

The 2nd reports confirmation that the probability of a single aphid (*M. persicae*) transmitting potato leaf roll virus decreases as the number of aphids is increased. With both 24-hr. and 5-day test feedings on *P. angulata* depression in individual efficiency of the vectors occurs, partly owing to interference by a colony on the feeding of individuals and in part to the effect on the susceptibility of the test plant. Feeding

of non-viruliferous aphids (5–10/plant) for 5 days before or after an inoculation feeding of 15 hr. or 5 days did not greatly affect infection, but feeding of 5 or more non-viruliferous aphids for 12 days before an inoculation feed of 5 hr. did. Marked variation in the ability of individuals to transmit the virus appeared to be heritable.

Payen (O.) & Madec (P.). **Sur la présence en France d'un nouveau virus de la Pomme de terre.** [On the presence in France of a new virus of the Potato.]—*C. R. Acad. Agric. Fr.*, **43**, 5, pp. 265–267, 1957.

A serum (80–16) from Ratte potatoes reacted positively with sap from the plants from which it had been prepared, and negatively with sap from healthy Bintje plants. Mosaic in Ratte plants is accompanied by a slight, soft rolling of the leaflets near the top of the plant; both symptoms also occur in aberrant Industrie plants. Tests demonstrated that the antibodies of serum 80–16 were not due to special proteins in the Ratte variety and were not specific for potato virus A; it was suspected that affected Ratte and Industrie plants contain a virus causing the mosaic and soft leaf roll symptoms. Other tests of 53 potato varieties affected by the mosaic showed that 6 were completely and 16 partially infected. Among the former was Fin de Siècle, which has a mosaic appearance and leaves slightly rolled up. Within this variety 16 plants derived from meristem cultures reacted positively towards 80–16 but negatively towards anti-X_1, -Y_1, and -S sera. The virus was also ascertained to be present in Ackersegen plants with mosaic and slight leaf curling. The new virus appears to be widely prevalent.

Sheffield (F[rances] M. L.). **Virus diseases of Sweet Potato in East Africa. I. Identification of the viruses and their insect vectors.**—*Phytopathology*, **47**, 10, pp. 582–590, 2 fig., 1957.

This paper presents in greater detail data which have already been noticed [**37**, p. 6].

Hildebrand (E. M.). **Isolation of cork virus from symptomless roots of Nemagold Sweetpotato.**—Abs. in *Phytopathology*, **47**, 9, pp. 523–524, 1957.

Symptomless Nemagold sweet potato roots indexed positively for internal cork virus on Scarlett O'Hara morning glory [*Ipomoea bona-nox* × *I. hederacea*: **35**, p. 632]. Subsequently developed foliage showed typical symptoms, but the roots were again symptomless, though indexing positively for the virus.

Bitancourt (A. A.) & Jenkins (Anna E.). **Estudos sôbre as Miriangiales. VIII. A antracnose maculada da Seringueira, causada par Elsinoe.** [Studies on the Myriangiales. VIII. Spot anthracnose of *Hevea* Rubber caused by *Elsinoe.*]—*Arq. Inst. biol., S. Paulo*, **23**, pp. 41–66, 4 pl., 1 map, 1956. [English summary. 41 refs. Received Oct. 1957.]

Spot anthracnose (*Elsinoe heveae* Bitanc. & Jenk., *Sphaceloma heveae* Bitanc. & Jenk., imperfect state hitherto undescribed) has been observed causing severe damage to young shoots of *Hevea* rubber, sometimes accompanied by defoliation, in the plantations of Amazonas, Pará, and São Paulo, Brazil (earliest and latest records for the country being 1942 and 1955, respectively), and in Guatemala (1948–9). The circular to irregular, vinaceous-brown, usually paler-centred spots, 1·5 mm. diam., with salient margins, may be scattered over the leaf blade or mainly concentrated towards the tip. On the veins, petioles, and stems the lesions are similar but elongated, reaching a length of 2 mm. Pulvinate, pseudoparenchymatous, hyaline perithecia, 45–250 × up to 30 μ, may be detected on old leaf spots, and acervuli, 30–50 × 25 μ, on the petioles. The globose or oval asci are 19–27 μ diam. and usually contain 8 ascospores, 14–19 × 5–8 μ, with 3–4 transverse and 1 or more longitudinal septa. Conidia were not observed.

Both the original isolates, one a tissue culture and the other monoascospore, at first produced a convolute growth on potato dextrose agar. The former subsequently sectored freely, giving rise to pulvinate colonies, while the latter remained convolute. Maintained at 12 constant temperatures between 3 and 36° C., 2 tissue strains made slight growth at the former and none at the latter. The max. diam. of 20 and 20·4 mm., respectively, for the convolute and pulvinate forms were attained at 24° and the max. fresh weights of 667 and 944 mg. at 27°. At these temperatures the moisture content also reached its highest level. The convolute strain retained the same appearance at all temperatures, whereas the pulvinate was pulvinate at 9–30°, slightly convolute at 6°, and entirely so at 33°. At the latter temperature 2 types of sector were differentiated, both convolute at 33°, while one was pulvinate at 24°.

Inoculation experiments on leaves 3·5–9 cm. long resulted in infection, the pathogen being reisolated; leaves 1·2–4 cm. were practically destroyed.

Ascospores are probably carried by the wind to the new tissues of leaves and shoots, where they germinate either by germ-tubes or secondary spores. Conidia, which are doubtless produced in the acervuli, are probably dispersed by rain, producing secondary infections in the new growth. Perithecia have been found in old leaves collected during Dec.; conidia formed in overwintering stem cankers would be ready to infect the newly developing leaves.

Control measures have not yet been investigated, but reference is briefly made to reports on the use of fungicides against similar diseases.

Mehta (P. P.) & Sinha (R. N.). **Sources of red rot infection: some observations in North Bihar.**—*Indian Sug.*, **7**, 5, pp. 337–339, 1957.

At the Central Sugar Cane Research Station, Pusa, a study of split canes from the areas of 7 sugar factories and the Pusa Farm revealed that primary infection through diseased setts is by far the most important source of infection by red rot [*Glomerella tucumanensis*]. In general, primary infection does not follow midrib lesions but secondary infection usually does so. The risk of major outbreaks through diseased plots and irrigation water was shown to be insignificant. No varietal differences were recognized in respect of reaction to primary and secondary infection.

Kar (K.) & Srivastava (D. D.). **Fungicidal treatment of Sugarcane setts.**—*Indian Sug.*, **7**, 5, pp. 333–334, 1957.

In experiments at the Sugarcane Research Station, Shahjahanpur, Uttar Pradesh, and at Gorakhpur during 1953–55, several fungicides proved ineffectual against red rot [*Glomerella tucumanensis*: **36**, p. 499]. In an exploratory trial at the Station the incidence of smut [*Ustilago scitaminea*: **36**, p. 279] was reduced from 6·2 to 0·9 and 1·1% by 7-min. suspension of the setts in 0·25% perenox or 1% agrosan, respectively, before planting in furrows contaminated with spore powder from freshly collected 'whips'.

Tandon (R. K.), Kar (K.), & Singh (D. R.). **Occurrence of Sugarcane rust in Uttar Pradesh.**—*Indian Sug.*, **6**, 11, pp. 681–683, 2 fig., 1957.

The detection of *Puccinia kuehnii* [**36**, p. 212] on sugarcane (mostly var. Co.S. 510) in 2 districts of Uttar Pradesh is reported from the Sugarcane Research Station, Shahjahanpur. Severe infection was also observed on *Saccharum spontaneum*.

Heat treatment limits stunting disease.—*Sugar y Azúcar* (formerly *Sugar, N.Y.*), **52**, 10, pp. 27–28, 2 fig., 1957.

This leading article summarizes the latest information regarding ratoon stunting virus disease of sugarcane and the promising results achieved in its control by

heat treatment. Eradication of the disease from Louisiana in the near future is predicted.

Wolf (F. A.). **Tobacco diseases and decays.**—Second edition, xvi+396 pp., 1 pl., 102 fig., Durham, North Carolina, Duke University Press, 1957. $7.50.

This comprehensive textbook on the diseases of tobacco during the growth period and the decays of the leaves during processing [cf. **15**, p. 402] has been thoroughly revised and brought up to date. Additional features include chapters on chemical injuries, weather as a primary factor in tobacco diseases, and hereditary diseases.

Todd (F. A.) & Clayton (E. E.). **Chemical treatments for the control of weeds and diseases in Tobacco plant beds.**—*Tech. Bull. N.C. agric. Exp. Sta.* 119, 23 pp., 3 figs., 1956. [Received 1957.]

Summarizing results obtained since 1942, the authors conclude that the best soil treatment for the combined control of weeds and diseases in tobacco seed beds on sandy loam soils is urea (1 lb./sq. yd.) + calcium cyanamide ($\frac{1}{2}$ lb./sq. yd.). In 1951–53 this gave an average of 35·5 plants/sq. ft., methyl bromide (9 lb./100 sq. yd.) 32 plants, and calcium cyanamide (1 lb./sq. yd.) 26·2 plants, compared with 14·5 in untreated plots. These treatments, with the exception of methyl bromide, are not so successful on heavier soils.

Rich (S.) & Taylor (G. S.). **Cottonseed oil formulations of organic fungicides for Tobacco.**—*Plant Dis. Reptr*, **41**, 5, p. 465–467, 1957.

In field spraying tests on tobacco against *Peronospora tabacina* [**36**, p. 357] at New Haven, Connecticut, certain organic fungicides mixed with cottonseed oil left much less visible residue on the leaves than the same sprays without oil. Maneb, zineb, dichlone, and streptomycin caused no visible leaf damage, thioneb moderate, and thiram severe injury. The oil did not appear to reduce the effectiveness of zineb, dichlone, or thiram against blue mould. After processing, residue was found only in the zineb-oil treated leaves; burn quality was impaired by thiram, thioneb, and streptomycin, the other formulations having little effect.

Gigante (R.). **Studio comparativo sulla istologia delle foglie di Tabacco sane, mosaicate, e con mascheramento dei sintomi del mosaico.** [A comparative study of the histology of healthy and mosaic Tobacco leaves, and those with masked symptoms of mosaic.]—*Tabacco,* **61**, 683, pp. 170–181, 7 fig., 1957. [English summary.]

In the province of Lecce, Apulia, southern Italy, the symptoms of mosaic virus on tobacco plants [cf. **30**, p. 83; **34**, p. 404, *et passim*] are readily identifiable up to the end of June, but during July–Aug. become masked. They return in Sept.–Oct. on plants left in the field.

Comparative observations on masked infections, visible infections, and healthy leaves, including measurements of the leaf thickness and cell dimensions of the palisade tissues, and the size and appearance of the chloroplasts, indicated that the masking restores the normal structure of the leaves.

McLaren (A. D.) & Takahashi (W. N.). **Inactivation of infectious nucleic acid from Tobacco mosaic virus by ultraviolet light (2537 A).**—*Radiation Res.*, **6**, 5, pp. 532–542, 1 graph, 1957. [35 refs.]

It is reported from the Departments of Soils and Plant Nutrition and Plant Pathology, University of California, Berkeley, that infectious nucleic acid from tobacco mosaic virus, prepared by Gieber & Schramm's method [**35**, p. 551], was inactivated by ultra-violet light (2,537A) with a minimum quantum yield of 3×10^{-4}. The process involved no reduction in intrinsic viscosity but there was a slight decline in optical density (0·7%) at 2,600A. The free nucleic acid proved to be about 6 times as sensitive as it was in the form of intact virus.

ALLEN (T. C.) & KAHN (R. P.). **Tobacco mosaic virus inhibition by Rice extracts.**—Abs. in *Phytopathology*, **47**, 9, p. 515, 1957.

Though half-leaves of Pinto bean [*Phaseolus vulgaris*] inoculated with 50:50 tobacco mosaic virus inoculum and water developed 150 lesions, dilution of the inoculum with an equal volume of rice leaf extract produced none. The inhibitor, not apparently heat labile, was also extracted from rice flowers, polish, roots, kernels, culms, and heat-dried or frozen leaves; from leaves and roots it was active up to 1:200 dilution, and from polish, up to 1:6,000.

DIMOND (A. E.) & CORDEN (M. E.). **Reduction and promotion of the development of Fusarium wilt of Tomato by gibberellic acid.**—Abs. in *Phytopathology*, **47**, 9, p. 519, 1957.

Tomato plants were sprayed with gibberellic acid (5, 10, or 20 p.p.m.) 1–2 weeks before inoculation with *Fusarium oxysporum* f. [*F. bulbigenum* var.] *lycopersici*. The lowest concentration decreased wilt symptoms, the 2 higher augmented them, and application at the time of inoculation had the greater effect; this effect lasted longer than that on growth, which was increased for 2 weeks only after application. Gibberellic acid (1–20 p.p.m.) had no effect on the growth of *F.* in culture.

SCHEFFER (R. P.) & COLLINS (R. P.). **Pathological respiration in Fusarium-infected Tomato plants.**—Abs. in *Phytopathology*, **47**, 9, p. 533, 1957.

Respiration of tomato leaves on plants infected by *Fusarium oxysporum* f. [*F. bulbigenum* var.] *lycopersici* was stimulated within 9–14 days to double that of the controls, but ethylene and air in various proportions or various concentrations of ethylene in solution had no such effect, fusarinic acid [**36**, p. 778] inhibited respiration if above 0·0005 M but had no effect if more dilute, and 2,4-D stimulated O uptake of both healthy and infected leaves. The ratio of CO_2 produced in N and in air did not vary materially in diseased or healthy plants. It was suggested that pathological respiration is not dependant on uncoupling reactions nor on interference with the Pasteur effect. As the disease developed the sensitivity of leaf tissues to malonate decreased.

SANWAL (B. D.). **Polyphenoloxidase and ascorbic acid oxidase activity in Tomato plants infected with Fusarium lycopersici Sacc.**—*Proc. Indian Acad. Sci.*, Sect. B., **44**, 5, pp. 257–270, 4 graphs, 1957.

At the Swiss Federal Institute of Technology, Zürich, stem samples of truck tomato plants inoculated with *Fusarium* [*bulbigenum* var.] *lycopersici* and exhibiting browning, with vein-clearing of the leaves, were taken at 7-day intervals over 35 days and examined for content of polyphenoloxidases [**36**, p. 284], ascorbic acid oxidase (to indicate an increase of other enzymes), and copper. Polyphenoloxidase activity in the stem increased continuously from the time of infection until wilting was complete. In the leaves it decreased from the 7th to 21st day, but had increased to nearly double that in the controls by the 28th day (when the mycelium reached the petioles of leaves showing vein-clearing and necrosis). The ascorbic acid oxidase level was unchanged in the diseased stems, but in the leaves it fell from the 7th to 14th day, subsequently returning to the control level. The initial drop in the level of both enzymes in the leaves might have resulted from the chelation of Cu ions by metabolic products from the pathogen, but there was no Cu deficiency in the leaves. Increase of polyphenoloxidase activity in the stem is possibly due to the liberation of free polyphenols by such metabolic products of the pathogen as vasinfuscarin [**33**, p. 453], or other enzymes. Conversion of some polyphenols to melanin by oxidase activity imparts the brown colour to diseased vessels.

NEWHOOK (F. J.). **The relationship of saprophytic antagonism to control of Botrytis cinerea Pers. on Tomatoes.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 5, pp. 473–481, 1 fig., 1957.

In glasshouse experiments at the Plant Diseases Division, Auckland, *Cladosporium herbarum*, *Penicillium* sp., and *Alternaria* sp., isolated from dead tomato petals and inoculated in pure and mixed culture on sterilized, dead petals gave complete control of *B. cinerea* inoculated 3–5 days later [**36**, p. 139]. Inoculation of *C. herbarum* and *P.* sp. on dead petals adhering to fruits following the use of fruit-setting sprays reduced *B. cinerea* infection of the trusses from 46 to 1% and 80 to 3% in two trials, respectively. The drop in infection rate, from almost 100% on petals inoculated when newly dead to 30% on those longer dead, was correlated with the visible growth of *C. herbarum* and *P.* spp. Natural infection of leaves by *C. fulvum* reduced subsequent (artificial) infection by *B. cinerea* from 100 to 13–38%.

There are few instances of antagonism of plant pathogens by *C. herbarum* [**22**, p. 495; **31**, p. 269]. The effect on *B. cinerea* was not due to lack of moisture or to exhaustion of nutrient in the substrate. The factor or factors responsible may be similar to the unidentified factor causing inhibition of spore germination in soils [cf. **37**, p. 24].

BROOK (P. J.). **A comparison of glasshouse and laboratory methods for testing fungicides against Botrytis cinerea.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 5, pp. 506–511, 1 diag., 1957.

The results of fungicide evaluations by the Plant Diseases Division, Auckland, using a standard slide spore-germination method against a tomato strain of *B. cinerea* [see above], were in general agreement with those previously obtained on tomatoes in the glasshouse with the same fungicides [**36**, p. 139]. The high laboratory ratings for copper fungicides ineffective in the glasshouse were due to the fact that spores of *B. cinerea* are able to germinate on heavy deposits of copper in the absence of free water. While laboratory assay on the causal fungus is not reliable for predicting accurately the relative value of fungicides it may be useful in selecting those materials worth field testing from a wide range of established fungicides.

BUTLER (E. E.). **Effectiveness of copper-treated paper wrappers in preventing spread of Rhizopus nigricans in mature-green Tomatoes.**—*Plant Dis. Reptr*, **41**, 5, pp. 474–477, 1957.

At the University of California, Davis, copper-treated paper wrappers failed to restrict fruit-to-fruit spread of *R. nigricans* [*R. stolonifer*] in inoculated, stored, green tomatoes. In *in vitro* tests penetration of copper-treated paper by *Phytophthora capsici* and *P. drechsleri* was restricted but a number of other tomato pathogens grew freely through it.

SILBERSCHMIDT (K.). **Uma doença do Tomateiro em Piedade, causada pelo virus Y da Batatinha.** [A disease of the Tomato in Piedade caused by Potato virus Y.]—*Arq. Inst. biol., S. Paulo*, **23**, pp. 125–150, 8 fig., 1956. [English summary. 21 refs. Received Oct. 1957.]

In Mar. 1953 samples of field tomato plants submitted for examination from the Piedade district of São Paulo, Brazil, showed vein-clearing of the enlarged veins of the abnormally small apical leaves with narrow leaflets. Greenhouse inoculation tests on healthy indicator plants demonstrated that a virus transmissible by grafting, sap, and aphids (*Myzus persicae*) was responsible.

About a fortnight after mechanical inoculation, Sta Cruz tomato seedlings developed distortions of the apical leaf blades and torsion of the tips. The leaflets were crowded and the leaves shorter than those of healthy plants. After a few

months the symptoms on the apical leaves tended to disappear but the older and middle ones were distorted. Var. Marglobe and *Solanum* [*Lycopersicon*] *pimpinellifolium* reacted similarly to inoculation.

Nicotiana rustica proved highly susceptible to the virus, developing veinbanding and malformation, which subsequently turned into blistering of the young leaves. A comparable response was observed in *S. ciliatum* inoculated through the older leaves. Extremely severe leaf necrosis, followed by leaf drop, occurred in very young chilli (*Capsicum annuum*) seedlings, while older plants and inoculated young leaves of White Burley tobacco, *N. glutinosa*, and *Petunia hybrida* were only mildly affected by veinbanding.

The thermal inactivation point of the Piedade virus was found to lie between 61 and 66° C. In a limited series of tests its longevity *in vitro* was less than 24 hr. After a 3-hr. fasting period non-viruliferous aphids acquired the virus from diseased plants within 10–30 sec.

The virus is referred to the non-persistent group as a strain of potato virus Y with the differential features of ability to cause severe leaf torsion in tomato and non-pathogenicity to potato.

Peace (T. R.). **Approach and perspective in forest pathology.**—*Forestry*, **30**, 1, pp. 47–56, 1957.

Following a brief review of the progress of forest pathology [**36**, p. 626] during the last 60 years, the author discusses the relationship of environment to disease and refutes the assumption that trees grown in an unnatural environment, as in pure stands or with planted exotics, are more prone to disease than in their native habitat.

Buckland (D. C.), Redmond (D. R.), & Pomerleau (R.). **Definitions of terms in forest and shade tree diseases.**—*Canad. J. Bot.*, **35**, 5, pp. 675–679, 1957.

This glossary was prepared by a sub-committee of the Canadian Phytopathological Society and contains 114 terms, together with an additional 13 used in tree surgery.

Annual Report of the Forest Insect and Disease Survey, Canada Department of Agriculture, 1956.—95 pp., 15 maps, 1957.

In the section of this report [cf. **36**, p. 69] dealing with the forest disease survey of the Atlantic Provinces (pp. 22–29) A. G. Davidson and W. R. Newell state that in northern New Brunswick as much as 75% of the leaves on some aspen trees were killed by ink spot (*Ciborinia whetzelii*). Of 1,222 poplar trees in plots in New Brunswick, Nova Scotia, and Prince Edward Island, 11·5% had cankers of *Hypoxylon pruinatum* [**34**, p. 682] which killed 3% of the diseased trees. *Fusicoccum abietinum*, and not *Valsa friesii* as previously reported [**34**, p. 680], is responsible for red flag of *Abies balsamea*. Damage to willows by blight (*Fusicladium saliciperdum* [*Venturia chlorospora*] and *Physalospora miyabeana* [loc. cit.; **36**, p. 561]) was heavier in the St. Joan River Valley, New Brunswick, than in the preceding season. *Chrysomyxa pyrolae* was recorded for the first time on black spruce [*Picea mariana*] in New Brunswick.

R. Pomerleau and J. Benazet (pp. 35–38) report from Quebec that Dutch elm disease [*Ceratocystis ulmi*] has now been found in every county in Quebec. In surveyed immature stands of *A. balsamea* 25% (of 2,617) were affected by *Phacidium infestans* [cf. **28**, p. 495], the only foliage disease of economic importance, 28% by *Lophodermium* sp., 19% by *Adelopus balsamicola* [**35**, p. 799], and 11% by *Trichosphaeria parasitica*. A needle yellowing affecting 1- or 2-year-old needles of jack pine [*Pinus banksiana*], and generally more in evidence at the base of the crown, was associated with *L. pinastri* [cf. **32**, p. 525], *Hypodermella ampla*, and

Asterina pinastri. White spruce [*Picea glauca*] needle rust (*Chrysomyxa ledi*) [**34**, p. 682] was severe in Abitibi County and *Cytospora kunzei* damaged blue spruce [*P. pungens*] in several areas. *Ciborina whetzelii* was reported on aspen from all parts of the Province.

From Ontario J. REID (pp. 56–58) lists a number of fungi responsible for heart rots in living trees: *Fomes igniarius*, *Radulum casearium* [**34**, p. 410], and *Pholiota spectabilis* [**32**, p. 520] from trembling aspen [*Populus tremuloides*]; *Stereum sanguinolentum*, *Odontia bicolor* [**34**, p. 414], and *Corticium galactinum* from *Abies balsamea*; *F. pini* and *Polyporus tomentosus* from *Pinus banksiana*; and *F. pini* and *C. galactinum* from various spruces. Canker (*Cytospora kunzei*) was confirmed from 4 species of spruce.

H. ZALASKY and C. G. RILEY report from Manitoba and Saskatchewan (p. 71) that *R. casearium* caused poplar trunk rot in many localities.

In Alberta (pp. 77–78) R. J. BOURCHIER found that moderate to heavy infection of *Atropellis piniphila* occurs on pine stands throughout the E. slope of the Rocky Mountains. *Chrysomyxa ledicola* was scarce on spruce owing to the dry summer.

A. C. MOLNAR reports from British Columbia (pp. 87–91) that yellow pine [*Pinus strobus*] sapwood deteriorated more rapidly than that of Douglas fir [*Pseudotsuga menziesii*]; the depths of penetration of decay 3 years after felling were 3 in. and 1 in., respectively, in the 2 timbers. In 1956 a canker and dieback of *P. menziesii* became severe, involving the appearance of leader and branch flags resulting from terminal dieback, together with cankers on the branches and stems. It is thought that at least two fungi are involved, including a species of *Pullularia*. The occurrence of *Melampsoridium betulinum* on western white birch [*Betula papyrifera* var. *occidentalis*] constituted a new host record for Canada.

GIBSON (I. A. S.). **A note-book on pathology in Kenya forest plantations.**—27 pp., 10 pl., 1 fig., 3 graphs, Nairobi, The Government Printer, 1957. 2*s*.

Contained in this handbook are brief descriptions of fungi in general and of the fungal diseases affecting forest plantations in Kenya in particular. Sections are devoted to damping-off [**35**, p. 798] in pine (*Pinus radiata*) and occasionally *Eucalyptus* nurseries; *Armillaria mellea* [**30**, p. 309], causing root rots; heart, butt, and structural rots; *Monochaetia unicornis* on *Cupressus* spp. [**34**, p. 330]; *Diplodia pinea* [cf. **35**, p. 732] associated with die-back of pine; and *Helicobasidium purpureum* causing purple root rot of mvule (*Chlorophora excelsa*) in nurseries.

Wood-rotting fungi.—*Agric. Gaz. N.S.W.*, **68**, 6, pp. 314–316, 3 fig., 1957.

The following are listed with notes on the damage caused to standing trees and timber locally and on control: *Polystictus versicolor*, *Schizophyllum commune*, *P. cinnabarinus*, *Corticium salmonicolor* [**35**, p. 661], and *Fomes applanatus* [*Ganoderma applanatum*].

Thulium X-ray units to determine extent of decay in standing trees.—*Timb. Tr. J.*, **220**, 4196, p. 90, 1957. [Abs. in *For. Abstr.*, **18**, 3, p. 367, 1957.]

A 13-lb. lead cylinder, 4×4 in., containing a pellet of Tu, is fixed to a trunk opposite a pliable industrial film-holder, and the pellet pivoted inside the sheath to the bark surface. Photographs taken round the periphery at known angles are read for density differences. Deviations from normal indicate defects, e.g. decay.

UBRIZSY (G.). **Újabb vizsgálatov uz erdőtípusok talajlakó nagygombáinak társulási viszonyairól.** [New studies on the associations of macroscopic fungi in the soil of different forests.]—*Ann. Inst. Prot. Pl. Hung.*, **7** (*1952–56*), pp. 409–444, 3 graphs, 1957. [Russian and French summaries.]

Observations in various forest associations in different parts of Hungary over

several years showed that the R factor (soil temp. $\times 10 \times$ soil R.H.) is the most important condition affecting the development and the propagation of the macroscopic fungi.

SNETSINGER (R.) & HIMELICK (E. B.). **Observations on witches'-broom of Hackberry.**—*Plant Dis. Reptr*, **41**, 6, pp. 541–544, 3 fig., 1957.

Observations at Urbana, Illinois, on witches' broom of hackberry (*Celtis occidentalis*) confirmed the association of *Sphaerotheca phytoptophila* and an eriophyid mite (*Aceria* sp.) with the brooms. The etiology is still undetermined.

BIRCHFIELD (W.) & WEBER (G. F.). **Blight fungus invades Chestnut from killed twigs.**—*Plant Dis. Reptr*, **41**, 4, pp. 359–361, 1 fig., 1957.

Examination of chestnut stands in western North Carolina destroyed by *Endothia parasitica* indicated that killed twigs served to infect new coppice, atypical cankers forming at the point of contact with young shoots.

BAKSHI (B. K.). **Wilt disease of Shisham (Dalbergia sissoo Roxb.). IV. The effect of soil moisture on the growth and survival of Fusarium solani in the laboratory.** —*Indian For.*, **83**, 8, pp. 505–511, 1 graph, 1957.

Further studies at the Forest Research Institute, Dehra Dun, suggest that *F. solani* on *Dalbergia sissoo* [**34**, p. 498] may be controlled by irrigation. The fungus grew and survived well in sterile loam soil with 20% moisture, but above this there was a sharp decline until contamination was eliminated with free water.

BAKSHI (B. K.), ARORA (K. K.), & SING (S.). **Root diseases of Shisham (Dalbergia sissoo Roxb.) V. Incidence of diseases in relation to soil pH and soil texture.**—*Indian For.*, **83**, 9, pp. 555–558, 1 fig., 1957.

In surveys by the Forest Research Institute, Dehra Dun, root disease of *D. sissoo* caused by *Fusarium solani* [see above], *Ganoderma lucidum*, and *Polyporus gilvus* [**36**, p. 432] was not found on sandy soils, but began to appear on sandy loam, becoming severe on clay loam and clay soils.

SCHIPPER (M. A. A.) & HEYBROEK (H. M.). **Het toetsen van Stammen van Nectria cinnabarina (Tode) Fr. op levende takken in vitro.** [The testing of strains of *Nectria cinnabarina* (Tode) Fr. on living branches *in vitro*.]—*Tijdschr. PlZiekt.*, **63**, 4, pp. 192–194, 1957. [English summary.]

In tests at the Phytopathologisch Laboratorium 'Willie Commelin Scholten', Baarn, on the susceptibility of elm strains to *Ophiostoma* [*Ceratocystis*] *ulmi* [**34**, p. 825] some of these, notably Christine Buisman, were found to be susceptible to *Nectria cinnabarina*. Strains of the latter were inoculated on to living maple or elm twigs ($\frac{1}{2}$–$\frac{3}{4}$ cm. in section), surface sterilized (96% alcohol, 15 sec.; 7% calcium chlorite, 30 min.). Non-virulent strains made sparse growth and did not kill the twigs, while virulent ones formed a thick surface layer of mycelium which did; these were used for testing elm.

HOLMES (F. W.). **Recorded Dutch Elm disease distribution in North America as of 1956.**—*Plant Dis. Reptr*, **41**, 7, pp. 634–635, 1 map, 1957.

In this report from the University of Massachusetts, Amherst, a first record of Dutch elm disease (*Ceratocystis ulmi*) [cf. **36**, pp. 286, 362] in Wisconsin (in 1956) is given and a number of additional locations in States where it has previously been reported.

SCHNEIDER (I. R.). **Comparison of the effect of some antibiotics, antifungal substances, and phenyl carbamates on the growth of two vascular parasites in vitro.**—*Plant Dis. Reptr*, **41**, 5, pp. 436–441, 1957.

In agar cultures at Beltsville, Maryland, cycloheximide at 8 p.p.m. completely

prevented the growth of *Endoconidiophora* [*Ceratocystis*] *fagacearum* from oak, but even at 200 p.p.m. it had little effect on *Ceratostomella* [*Ceratocystis*] *ulmi* from elm [cf. **36**, p. 363]. Pleocidin showed a similar effect while gramicidin S, endomycin, and fracidin were more effective against *C. ulmi*. All the antibiotics (except cycloheximide) were shown to be fungistatic but not fungicidal. Some of the 2-pyridinethiol-l-oxide derivatives and 2 phenyl carbamates were fungicidal, but a high concentration was needed or long periods of exposure, conditions likely to result in injury to the host before destruction of the pathogen.

BRETZ (T. W.) & JONES (T. W.). **Oak flowers may serve as infection courts for the Oak wilt disease.**—*Plant Dis. Reptr*, **41**, 6, p. 545, 1957.

Experiments by Missouri Agricultural Experiment Station and the Central States Forest Experiment Station with 6 species of oak indicated that infection by spores of *Ceratocystis fagacearum* [**36**, p. 435] can occur through injured flowers.

BRETZ (T. W.) & BUCHANAN (W. D.). **Oak wilt fungus not found in acorns from diseased tree.**—*Plant Dis. Reptr*, **41**, 6, p. 546, 1957.

Failure to recover *Ceratocystis fagacearum* from acorns of diseased oaks (*Quercus velutina*) when the fungus was obtained from approximately half of the twigs bearing them suggests that seed transmission is not common.

GILLESPIE (W. H.), SHIGO (A. L.), & TRUE (R. P.). **The degree of mat-production control obtained by girdling Oak wilt trees in West Virginia and some factors influencing mat formation in girdled trees.**—*Plant Dis. Reptr*, **41**, 4, pp. 362–367, 1 map, 1957.

Examination at W. Virginia Agricultural Experiment Station in 1956 of 117 oak trees of three species from which *Endoconidiophora* [*Ceratocystis*] *fagacearum* had been isolated confirmed the effectiveness of the deep-girdle method for checking mat production [**36**, p. 142], but 10% of the trees girdled before Aug. and 20% of those girdled in Aug. formed some mats.

BRETZ (T. W.). **The Allegheny chinkapin and two exotic Oaks susceptible to Oak wilt.**—*Plant Dis. Reptr*, **41**, 4, p. 368, 1957.

At Missouri Agricultural Experiment Station, *Castanea pumila*, *Quercus brutia*, and *Q. lusitanica* proved susceptible when inoculated with *Endoconidiophora* [*Ceratocystis*] *fagacearum* in the nursery.

MIELKE (J. L.). **Aspen leaf blight in the intermountain region.**—*Res. Note Intermount. For. Range Exp. Sta. Utah* 42, 5 pp., 1957. [Mimeographed.]

Marssonina populi [*Pseudopeziza populorum*: cf. **30**, p. 202] is the cause of a leaf and shoot blight of quaking aspen (*Populus tremuloides*) and other *P.* spp. in Utah and neighbouring States. The fungus becomes epidemic in seasons with high spring and summer rainfall and was particularly severe in 1948 and 1949. Affected leaves turn colour prematurely and in severe attacks the above-ground portions of the tree may be killed, but as aspen stands are perpetuated by sprouting from the roots the damage is not permanent. Many immune clones are scattered among more susceptible ones and are identifiable in coloured photographs taken in late summer in years of high infection.

KRSTIĆ (M.). **Septotinia populiperda — nov parazit kod nas.** [*Septotinia populiperda* —a new parasite in our country.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 37, pp. 87–89, 1956. [English summary.]

S. populiperda is stated to be attacking a number of poplar species [cf. **34**, p. 684] in Serbia, Yugoslavia. *Populus robusta* and *P. marilandica* appear to be the most susceptible; *P. serotinia* and *P. balsamifera* are affected only sporadically.

Van Eimern (J.). **Die Witterung im Winter 1954/55 und im Frühjahr 1955 und ihre mögliche Bedeutung für den Rindentod der Pappel.** [The weather in the winter of 1954–5 and the spring of 1955 and its possible significance for bark necrosis of Poplar.]—*Forstarchiv.*, **27**, 2, pp. 30–34, 1956. [Abs. in *For. Abstr.*, **18**, 3, p. 370, 1957.]

The increased susceptibility of poplars to *Dothichiza populea* [**36**, p. 738] in the Hamburg area may have been related to the mild autumn and winter, 1954, a severe frost in November, an early spring, 1955, with frequent and extreme changes of temperature, and a wet late spring.

Moriondo (F.). **La prevenzione alla moria del Pioppo.** [The prevention of Poplar decline.]—ex Relazioni del Convegno tecnico per la coltivazione e la difesa fitosanitaria del Pioppo, Ponte Buggianese, 1957, pp. 19–25, 2 fig., 1957.

After briefly discussing the diseased condition of poplars in Italy, associated chiefly with *Dothichiza populea* [**30**, p. 636, *et passim*], the author notes a few observations made by himself in 1953–4, refers to fungicidal methods of control used in America, and states that under Italian conditions control depends primarily on choosing clones suited to the environment and using proper cultural practices, fungicidal control being a last resort.

Banerjee (S.). **Parasitism of Polystictus sanguineus (L.) Mey. on Shorea robusta Gaertn. f.**—*Sci. & Cult.*, **23**, 2, p. 100, 1957.

Inoculation experiments at the University College of Science, Calcutta, showed that *P. sanguineus* can infect standing trees of *S. robusta* [**35**, p. 734], invading the living tissues of the cortex and outer sapwood through wounds in the bark and killing the cambium at the place of infection.

Bier (J. E.). **The relation of bark moisture to the development of canker diseases with particular reference to Cryptodiaporthe canker on Willow.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **13**, 4, pp. 3–4, 1957.

During the winter 1956–7 many young willows in Vancouver were killed by *Cryptodiaporthe salicina* [cf. **28**, p. 93]. This canker disease is more common in Vancouver than in eastern Canada, possibly owing to the milder climate which permits growth of the fungus during the dormant season of the host when the tissues are low in moisture. In laboratory tests growth of *C. salicina* was rapid in bark with a moisture content of 50–55% of the green bark; an increase to 60% resulted in cessation of growth, a condition arising when dormancy breaks in the spring. It is suggested that bark moisture content may serve to indicate relative susceptibility to *C. salicina* canker and simplify the correlation of this with complex ecological and climatic factors.

Rishbeth (J.). **Some further observations on Fomes annosus Fr.**—*Forestry*, **30**, 1, pp. 69–89, 1 pl., 1 graph, 1957.

It has been definitely established that in many British forests attacks of *F. annosus* [**36**, p. 626] originate from stump infection following thinning and other felling operations and under certain conditions a relationship can be established between the number of trees killed and the proportion of infected stumps. Hardwoods may be attacked in addition to conifers. Stump infection in East Anglia reaches a peak in late winter and drops off sharply in spring or early summer. In the dry years 1947 and 1955 unusually heavy infection occurred in summer, possibly owing to a drought resistance of *F. annosus* sporophores superior to that of its competitors, including *Peniophora gigantea*.

The incidence of stump infection is largely unpredictable, but in general it tends to increase. In Thetford Chase *F. annosus* incidence is stabilized on some

acid soils but is increasing on alkaline ones. It is estimated that in future average thinning losses in plantations over 25 years old on acid soils should not exceed 4%.

Creosote is still the best stump treatment, when the principal source of infection is air-borne *F. annosus* spores, and is the cheapest, costing 2*s*. 6*d*./acre, excluding labour, compared with paint (53*s*.), formalin (10*s*.), sodium chlorate (4*s*. 6*d*.), and ammonium sulphamate (29*s*.).

HOLMSGAARD (E.). **Forsøg på en opgørelse over Trametesskadernes økonomiske betydning.** [Attempt at a statement regarding the economic importance of *Trametes* injuries.]—*Dansk Skovforen. Tidsskr.*, **42**, 4, pp. 237–343, 1957.

It is computed on the basis of statistical data collected in the conifer plantations and forests west of the Jutland ridge, Denmark, that damage by *Trametes* [*Fomes annosus*: **36**, p. 221] is costing the country at least Kr. 8,000,000 per annum and will continue to do so until an effective method of control is devised [see above]. The average percentage of infection in 3 stands of 20–29-yr.-old trees was 9; in 9 of 30–39, 15; in 15 of 40–49, 37; in 44 of 50–59, 41; in 35 of 60–69, 36; and in 30 over 70, 27. Distributed in diameter classes the percentages were as follows: in 9 stands of 5–9 cm., 15; in 55 of 10–14, 35; in 49 of 15–19, 36; and in 23 over 20, 23.

HAHN (G. G.). **Phacidiopycnis (Phomopsis) canker and dieback of conifers.**—*Plant Dis. Reptr*, **41**, 7, pp. 623–633, 5 fig., 1957. [23 refs.]

From the Northwestern Forest Experiment Station, New Haven, Connecticut, the author describes the symptoms of natural infection by *Phacidiella coniferarum* (*Phomopsis pseudotsugae*) [map 320; **36**, p. 625] on a number of conifers, and in particular on Douglas fir (*Pseudotsuga menziesii*) in Europe, and also on larch and pine. The results of inoculations in Connecticut of 9 species of conifer are also described. The disease occurs in the United States only in the N.E. and on white pine [*Pinus strobus*], but despite the completion of the life-cycle there, the author considers the American origin of the pathogen as uncertain.

ETHERIDGE (D. E.) & CARMICHAEL (ELIZABETH). **Observations on Coryne sarcoides (Jacq.) Tul.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **13**, 4, p. 3, 1957.

Further studies [**35**, p. 799] disclosed that the incidence of *C. sarcoides* in Alberta during 1955–6 was greater on spruce than on lodgepole pine [*Pinus contorta* var. *latifolia*] and was more frequently associated with brown than with white rots. Of 335 samples of lodgepole pine, 7·5% were infected by *C. sarcoides* and 35% of 138 white spruce [*Picea glauca*] samples. *C. sarcoides* is the most common organism occurring in the heartwood of living white spruce and the incidence of this fungus in slash almost doubled from 1954–56. Microscopic examination of wood stained purple by the fungus disclosed minute bore-holes and constricted hyphae characteristic of non-decay-causing fungi which are unable to penetrate cell walls by enzyme action, though isolates of *C. sarcoides* can attack cellulose.

An antibiotic antagonistic to several species of wood-destroying fungi is produced by some strains of *C. sarcoides*. On agar plates the growth of *Coniophora puteana* was prevented by several isolates, and decay caused by *C. puteana* and *Polyporus tomentosus* reduced by 50–75% by one.

HEIMBURGER (C.). **Blister rust resistance in White Pine.**—*Proc. 3rd Ntheast. For. Tree Improvement Conf., Ithaca, 1955*, pp. 6–13, 1956. [Abs. in *For. Abstr.*, **18**, 3, p. 313, 1957.]

Data obtained by the Ontario Dept of Lands and Forests showed that *Pinus*

strobus seedlings are probably more susceptible to blister rust [*Cronartium ribicola*] than grafts, *P. monticola* grafts are more susceptible than *P. strobus* grafts, and its seedlings less so; *P. peuce* (grafts and seedlings) is significantly more resistant than the other species.

BEGA (R. V.). **The use of detached Ribes and Pine leaves in studies with Cronartium ribicola.**—Abs. in *Phytopathology*, **47**, 9, p. 516, 1957.

A method is described whereby the use of moist sand in Petri dishes or of L-shaped tubes with nutrient solution enabled leaves or small branches to be maintained alive for periods (6 months for pine needles, up to 60 days for *Ribes* leaves) long enough to permit study of rust development in relation to microclimate.

VAN ARSDEL (E. P.), PARMETER (J. R.), & RIKER (A. J.). **Elevation effects on temperature and rainfall correlated with blister rust distribution in south-western Wisconsin.**—Abs. in *Phytopathology*, **47**, 9, p. 536, 1957.

In S.W. Wisconsin *Cronartium ribicola* occurs to any appreciable extent only above 1,000 ft., its presence being correlated with the lower temperatures and higher rainfall prevailing at these elevations [cf. **36**, p. 147].

TANI (T.) & NAITO (N.). **On the nitrogen content of plants infected by several rust fungi.**—*Tech. Bull. Kagawaken agric. Coll.*, Ser. 20, 7, 2, pp. 141–143, 1956. [Abs. in *For. Abstr.*, **18**, 3, pp. 370–371, 1957.]

Sapwood and heartwood of *Pinus thunbergii* infected [in Japan] by *Cronartium quercuum* [**23**, p. 198, *et passim*] contained more N compounds than the healthy wood.

MIELKE (J. L.). **A needle cast of Lodgepole Pine caused by the fungus Hypodermella concolor.**—*Res. Note Intermount. For. Range Exp. Sta. Utah* 27, 3 pp., 1956. [Mimeographed. Received July 1957.]

In the intermountain region of Utah lodgepole pine (*Pinus contorta* [var. *latifolia*]) is affected by needle cast (*H. concolor*) [**25**, p. 421]. In Canada the pathogen occurs also on jack pine (*P. banksiana*). Infection occurs in summer on the needles of the current season, which do not show symptoms, but in the following season turn reddish brown and then greyish owing to the fruiting bodies of the fungus. Finally in the late summer the diseased leaves are shed. The most severe infections were noted in cool, moist areas, and the growth increment of trees infected for several successive years is reduced, though the trees are not killed.

HUNT (J.) & CHILDS (T. W.). **Ponderosa Pine needle blight in eastern Oregon during 1955 and 1956.**—*Res. Note Pacif. Nthwest For. Exp. Sta.* 147, 9 pp., 1 graph, 1 map, 1957. [Mimeographed.]

From a survey of 711 sample plots and 1,063 miles of roadside strip in the Pacific Northwest it was found that severe needle blight [*Elytroderma deformans*: **36**, p. 220] of ponderosa pine [*Pinus ponderosa*] was present on less than $\frac{1}{10}$th of the acreage surveyed. Even in severely infected stands few of the merchantable trees were seriously affected. Needle blight was most severe at 5,000 ft. and in stands of moderate density.

COHEN (L. I.) & WATERS (C. W.). **Some observations on an undescribed disease of Ponderosa Pine twigs.**—*J. For.*, **55**, 7, pp. 515–517, 3 fig., 1957.

A disease of unknown origin attacking *Pinus ponderosa* near Missoula, Montana, is described. It is characterized by the formation of galls on the branches, consisting of compact aggregates of abnormally proliferated buds; the failure of the buds

to elongate reduces the needle bearing surface and thus may affect the annual radial growth of the tree. Although dark, septate hyphae have been found in the gall tissues, so far the disease is not connected with any particular organism; it is of no economic importance.

Eades (H. W.) & Roff (J. W.). **Red heart stain of Lodgepole Pine logs in the northern interior of British Columbia.**—14 pp., Vancouver Laboratory, Forest Products Laboratories of Canada, Dept of Northern Affairs and National Resources, 1957. [Mimeographed.]

One of the most important timber species in northern British Columbia is lodgepole pine (*Pinus contorta* var. *latifolia*), but a red heart stain characteristically detracts from its value. Red heart may be caused by *Fomes pini*, but in Alberta the majority of red heart infections were associated with *Stereum pini* [**35**, p. 854].

In an analysis of red heart from 10 localities in northern British Columbia, *F. pini* was isolated from 50% of the samples, while together with *S. pini* and *S. sanguinolentum* it was responsible for red stain in 90%. *Polyporus anceps* was not isolated from lodgepole pine in this study, though previously thought to be a contributory factor to red heart in western Canada.

The most common infection courts for *F. pini*, *S. pini*, and *S. sanguinolentum* were branch stubs; trunk scars and broken tops were less important.

In freshly cut specimens heart stain caused by *F. pini* was usually reddish, that by *S. sanguinolentum* brown in colour and usually separable in the incipient stage by its irregular outline. It is difficult to distinguish between stains caused by *F. pini* and *S. pini* visually, but the advanced rots are quite distinct in *F. pini* (small white pockets) and *S. sanguinolentum* (a brown, crumbly rot), though not yet observed in *S. pini*.

The presence of *F. pini* heart stain had no effect on the service life of ties and poles of jack pine [*Pinus banksiana*] and the fungus gradually died while the timber was in use. It may be assumed that these findings could be applied to *F. pini* in lodgepole pine. Nothing is known of the effect of *S. pini* on the strength and durability of this timber.

Hacskaylo (E.) & Palmer (J. G.). **Effects of several biocides on growth of seedling Pines and incidence of mycorrhizae in field plots.**—*Plant Dis. Reptr*, **41**, 4, pp. 354–358, 6 fig., 1957.

In a joint study by the U.S. Dept Agric. and the George Washington University mycorrhizal pine seedlings were grown in 5-ft. sections of 4-ft. diam. concrete pipe sunk and filled with soil. High concentration of methyl bromide (1 lb. per 'pot', covered for 4 days) prevented mycorrhizal formation on Virginia and slash pines (*Pinus virginiana* and *P. elliottii*) during one growing season, though the seedlings grew better than the watered controls. Vapam and bedrench (allyl alcohol and ethylene dibromide) only partially checked mycorrhiza. Ethylene dibromide and nemagon (1,2-dibromo-3-chloropropane) had no noticeable effect on the mycorrhiza, but the latter was somewhat phytotoxic.

Durrieu (G.). **Influence du climat sur la biologie de Phaeocryptopus gaeumanni (Rohde) Petrak parasite du Pseudotsuga.** [Influence of climate on the biology of *Phaeocryptopus gaeumanni* (Rohde) Petrak, parasite of *Pseudotsuga*.]—*C. R. Acad. Sci., Paris*, **244**, 16, pp. 2183–2185, 4 graphs, 1957.

The author concludes that a direct relationship exists between the severity of infection by *P. gaeumanni* on *Pseudotsuga* [*menziesii*] and the amount of precipitation during the ripening of the ascospores [cf. **19**, p. 736]. In the Toulouse region of France, for instance, where there is a marked decline in the rainfall in early summer, some perfectly healthy trees have been observed.

Hunt (J.) & Wright (E.). **Needle-cast of Sitka Spruce in Oregon.**—*Plant Dis. Reptr*, **41**, 7, p. 650, 1957.

The causal agent of a needle-cast of 25-year-old Sitka spruce (*Picea sitchensis*) has been identified at the Pacific Northwest Forest and Range Experiment Station, Portland, Oregon, as *Lophodermium filiforme* [*L. macrosporum*: cf. **33**, p. 457], only previously reported on the Pacific Coast from Alaska.

Blattný (C.). **Poznámky o virose Smrku. Předběžné sdělení.** [Notes on a virus disease of Spruce. Preliminary report.]—*Sborn. čsl. Akad. zeměd.* [*Ann. Acad. tchécosl. Agric.*], **29**, 10, pp. 771–774, 1956. [Abs. in *For. Abstr.*, **18**, 3, p. 371, 1957.]

Grafting tests to ascertain whether a yellow-white needle disease of spruce in Czechoslovakia [**27**, p. 503] is due to a virus proved inconclusive, though fewer scions from diseased than from healthy trees formed successful unions. The condition was transmitted experimentally by the aphid *Chermes abietis* in 20% of the tests. The proteins of affected stems differed in their serological and electrophoretical properties from those of healthy stems.

Henderson (F. Y.). **Report of the Director of Forest Products Research for the year 1956.**—*Rep. For. Prod. Res. Bd, Lond., 1956*, pp. 5–57, 8 pl., 7 graphs, 1957.

In the mycology section (pp. 31–37) of this report [cf. **35**, p. 856] it is noted that *Poria nigrescens* was isolated from rotting timber in cooling towers in Germany and Great Britain. Previously known as of importance in cooling towers in the United States, this is its first recorded occurrence in such towers in Europe. Samples of *Sequoia* from American cooling towers and of western red cedar [*Thuja plicata*] from a tower in this country were also found to be affected by a soft rot [unspecified], as were the surface layers of Scots pine [*Pinus sylvestris*] immersed in Norwegian rivers for up to 150 yr. Samples of *Lovoa klaineana* and *Guarea* sp. provided instances of soft rot in standing trees.

Chaetomium globosum decay was found not necessarily to be accompanied by the formation of fruit-bodies on the surface of the wood if additional nutrients were in short supply. In laboratory tests timber samples at 90% R.H. which had been sprayed with *C. globosum* spores were extensively colonized by a *Phoma* sp.

The rate of decay of wood by *Coniophora cerebella* [*C. puteana*] was increased by treatment with sodium fluoride up to 0·02%, but at 0·05% the fluoride exerted a toxic effect. Similar stimulation occurred with *Poria vaporaria*, and the respiration of these fungi in the presence of sodium fluoride is to be investigated.

In comparative decay tests the toxic limits were generally similar whether the test fungi were grown by the soil-block method or on malt agar. *C. puteana* and *P. vaporaria* grew rather better in soil-block tests and *Polystictus versicolor* and *Lentinus lepideus* on malt agar. *Chaetomium globosum* was more resistant to pentachlorophenol than most basidiomycetes but not to creosote or copper naphthenate.

Premature decay of boxes made of *Thuja plicata* and used for growing bulbs was due to a fungus resembling *Merulius sclerotiorum*. Samples of the soil from these boxes stimulated timber decay by *C. globosum*.

The addition to bilge water of a slightly soluble fungicide may assist in the prevention of decay in boats [**34**, p. 562]. In laboratory tests timber was protected against fungal attack by immersion in water saturated with pentachlorophenol.

Sap-stain in imported Maracaibo boxwood [*Gossypiospermum praecox*] logs due to *Diplodia natalensis* appeared in hot summer weather owing to infection already present under the bark. The staining organism in a half-log of 8½ in. diam. was killed after 4 hr. at 65° C. in a saturated atmosphere.

Blew (J. O.). **Comparison of wood preservatives in stake tests (1957 Progress Report).**—*Rep. For. Prod. Lab., U.S. Dep. Agric., For. Serv.* 1761, 47 pp., 1 pl., 1957.

This progress report on stake tests, by the Forest Products Laboratory, Madison, Wisconsin [**36**, p. 562], contains a discussion of results obtained with pressure- and non-pressure-treated stakes of southern yellow pine and stakes of treated and untreated plywood, modified woods, laminated paper plastic, and wood infected by *Trichoderma*. The 34 tables include an index to the materials tested and detailed results of the tests, and there is a summary of results with wood preservatives and oils in general use.

Etheridge (D. E.). **A method for the study of decay resistance in wood under controlled moisture conditions.**—*Canad. J. Bot.*, **35**, 5, pp. 615–618, 3 fig., 1957.

In a study of the effects of variations in moisture content, specific gravity, growth ring frequency, and chemical properties of fast- and slow-growing spruce heartwood on decay by *Coniophora puteana* under laboratory conditions at the Forest Biology Laboratory, Calgary, Alberta, several new techniques were devised. The moisture content of the test blocks was expressed by the formula:

$$\%\ \text{Saturation} = \frac{[(M-28)SG]}{1-0{\cdot}93SG}$$

where M = conventional moisture content and SG = specific gravity of the wood based on the green volume, assuming the fibre saturation-point to be 28% of the oven-dry weight and the specific gravity of the dry wood substance to be 1·46. The blocks were inoculated by disks (22 mm. diam.) or plugs (6 mm. diam.) of wood which had been placed in 250 ml. flasks on a layer of spruce sawdust to which water was added to 170% of its oven-dry weight. After sterilization at 15 lb./sq. in. for 30 min. they were inoculated and incubated with the test fungus for 3 months, the moisture content of the wood plugs being kept at 70–80% of the oven-dry weight. The test blocks were sterilized with propylene oxide gas [**26**, p. 461] in a manner which had a negligible effect on the moisture content and transferred to culture jars when the required moisture content was obtained by injecting distilled water from a calibrated hypodermic syringe. The blocks were then inoculated by inserting the infected plug in the hole from which it was taken, the lids of the jars loosely screwed down, and the jars placed in saturated humidity chambers. Halfway through the incubation time the water content of the blocks was adjusted in a room which had been sterilized by ultra-violet light. At the end of the experiment the decay activity was measured as the loss of weight during incubation as a percentage of the original oven-dry weight.

The advantages of this procedure are that tests can be carried out on wood which has not been pre-heated, the use of wood inoculum is more similar to natural infection and the chance of introducing growth-promoting substances is reduced, the method of expressing moisture content eliminates differences in the moisture content of the wood resulting from differences in the size of the cells, and the moisture content of the test blocks is adjustable during the incubation period.

Mizumoto (S.). **Studies on Lenzites abietina Fr. and some of its allied species. V. Carbon sources of L. abietina Fr., L. subferruginea Berk., L. trabea (Pers.) Fr., and L. saepiaria (Wulf.) Fr. IX. On the influence of temperature upon the decay of wood blocks attacked by L. abietina Fr., L. subferruginea Berk., L. trabea (Pers.) Fr., and L. saepiaria (Wulf.) Fr. X. Effect of growth substances upon the mycelial growth of L. abietina Fr., L. subferruginea Berk., L. trabea (Pers.) Fr., and L. saepiaria (Wulf.) Fr. XI. Effect of copper sulphate upon L. abietina Fr., L. subferruginea Berk., L. trabea (Pers.) Fr., and L. saepiaria**

(Wulf.) Fr.—*J. Jap. For. Soc.*, **38**, 2, pp. 71–73, 8 graphs; 11, pp. 437–439, 4 graphs, 1956; **39**, 1, pp. 28–32, 11 graphs; 5, pp. 175–179, 1957. [Japanese. Abs. from English summaries.]

From these studies begun at the Faculty of Agriculture, Shinshu University, Ina, Nagano, and completed at the Forest Experiment Station, Hamakita, Shizuoka Prefecture, Japan, it was concluded that (*a*) growth of *L. abietina*, *L. subferruginea*, *L. trabea*, and *L. saepiaria* was best in culture with 5% sucrose; (*b*) the opt. temperatures for mycelial growth and decay of test blocks were 26–28° C. for *L. abietina* and 32–34° C. for the other species; (*c*) the addition of thiamine (100 μg./l.), biotin, or inositol promoted growth in artificial media; and (*d*) the lowest concentrations of $CuSO_4$ inhibiting growth on agar media were for *L. abietina* 0·3%, *L. subferruginea* and *L. saepiaria* 0·4%, and *L. trabea* 0·5%, in comparison with *Poria vaporaria* 0·7% and *Polystictus sanguineus* 0·5%. Sugi [*Cryptomeria japonica*] blocks impregnated with $CuSO_4$ were highly resistant to all the fungi.

Bakshi (B. K.). **Decay in wooden shingles on building roof.**—*J. Timb. Dryers' & Preservers' Ass. India*, **3**, 1, pp. 24–25, 1 fig. [? 1957.]

A description is given of *Polyporus versatilis* causing a white pocket rot in pine (*Pinus excelsa*) shingles on the roof of the Forest Research Institute, Dehra Dun. They were placed there in 1926 after treatment with equal parts of creosote and diesel oil in a hot open tank for 12–16 hr. and the upper surfaces were subsequently brushed annually with equal parts of creosote and kerosene oil. In laboratory tests *P. versatilis* was not creosote-resistant.

Sutić (D.). **Bakteriska pegavost lisća Leske.** [Bacterial leaf spot of Filbert.]—*Zasht. Bilja* (*Plant Prot., Beograd*), *1956*, 37, pp. 47–53, 1956. [English summary.]

In studies on bacterial diseases in Yugoslavia *Xanthomonas corylina* was found to be responsible for the bacterial leaf spot of filberts [*Corylus maxima*: cf. **32**, p. 704]. So far there is no information concerning the disease in Yugoslavia, where it is widespread, and very little is given in foreign literature. The author suggests that on account of the polar flagella the bacterium should be classified in *Pseudomonas*.

Control measures recommended include the use of healthy planting material, removal of infected branches, and spraying with copper.

Kenner (P. D.). **Virus diseases of plants in Arizona. II. Field and experimental observations on curly-top affecting vegetable crops.**—*Bull. Ariz. agric. Exp. Sta.* 271, 28 pp., 14 fig., 2 diag., 1956. [22 refs. Received Sept. 1957.]

In this bulletin [cf. **35**, p. 649] notes are presented, based on observations and experiments in Arizona, on the reactions of plants, particularly of vegetable crops, to infection by strains of North American curly top virus [beet curly top virus: cf. **35**, p. 739, *et passim*]. The subject is dealt with under the following main headings: economic importance of the disease; geographical distribution in North America; crops affected; symptoms (on leaf, stem, flower, fruit, and root); spread by *Circulifer tenellus* [*Eutettix tenella*]; and control, mainly by the use of resistant varieties, improved sanitary practices, timing of planting, use of barrier or trap crops and mechanical barriers of fine mesh, and insecticidal spraying [cf. **32**, p. 219]. An appended table indicates whether the vegetables grown in Arizona had been reported to be affected up to 1 July 1955.

Walker (J. C.) & Edgington (L. V.). **Studies of internal tipburn of Cabbage.**—Abs. in *Phytopathology*, **47**, 9, p. 537, 1957.

A necrotic breakdown beginning in the marginal tissue of leaves located near the centre of cabbage heads [in Wisconsin] is known as internal tipburn and has been

shown to be associated with a deficiency of Ca. The disease occurs chiefly in poorly drained places; here the marginal tissue of the heart leaves was found to have only about one third the average amount of Ca for the total head tissue, in both healthy and diseased plants.

Wilson (J. D.). **Initial and subsequent control of Radish yellows by various treatments during eight successive plantings.**—Abs. in *Phytopathology*, **47**, 9, p. 538, 1957.

Some details are given of the results obtained with a number of chemicals used to control radish yellows (*Fusarium oxysporum* f. *conglutinans*) [*F. conglutinans*: **33**, p. 130] in successive plantings of radish. The most durable was chloropicrin, followed by mylone (3,5-dimethyltetrahydro-1,3,5,2H-thiadiazine-2-thione) and vapam. The effects of steam sterilization did not last beyond the 4th planting.

Volcani (Z.). **Soft rot on Japanese Radish caused by a strain of Erwinia carotovora.** —*Rec. agric. Res. Sta. Rehovot*, **7**, 2–3, pp. 141–142, 1957.

A soft rot of Japanese radish growing in Cabri, south Israel, was caused by a non-gas-forming strain of *E. carotovora* [cf. **29**, p. 502]. Bacteria isolated from diseased radishes reproduced the disease in inoculation tests when introduced through pricks. Tomato fruits, avocado pears, and [chilli] peppers also developed a soft rot after experimental inoculation.

Venezia (M.). **Il cuprothex B.P.D. nella lotta contro la Cercospora delle Bietole.** [Cuprothex B.P.D. in the control of Beet *Cercospora*.]—*Notiz. Malatt. Piante*, **39** (N.S. **18**), pp. 97–98, 1957.

A note is given on a field test carried out at Padua, Italy, in which control of *C.* [*beticola*: **35**, p. 259] on Alba beets was given by cuprothex B.P.D., containing 35% copper as neutral salt and 9·6% zineb.

Kulikova (Mme G.). Опыліивание Сахарной Свеклы серой. [Spraying Sugar Beet with sulphur.]—*Sel. Khoz. Kazakh.*, **8**, pp. 46–47, 1956. [Abs. in *Referat. Zh. biol.*, **13**, p. 211, 1957.]

In the Alma-Atinsk region of Kazistan SSR control of downy mildew [*Peronospora schachtii*: **23**, p. 465] on sugar beet was attempted by sulphur spraying (30 kg./ha.).

Home grown threshed Peas joint committee report for 1955.—48 pp. 2 graphs, 1 map, 1957.

In this 11th annual report it is stated that leaf and pod spot (*Ascochyta* spp. [**31**, p. 264; **32**, p. 296] and *Mycosphaerella* [*pinodes*]) was rare in England and Wales though much infected seed was sown. Damage from *Peronospora viciae* was less serious than in the previous year and there was little damage by *Erysiphe polygoni*.

Cruickshank (I. A. M.). **A note on the incidence of Ascochyta species in Pea seed.** —*N.Z. J. Sci. Tech.*, Sect. A, **38**, 5, pp. 497–499, 1957.

In pea seed from Canterbury and Marlborough *Mycosphaerella pinodes* [**34**, p. 213] was the most common pathogen of those in the collar rot complex [**35**, p. 81] to be detected during 1950–54 by platings of seed. The importance of dry weather for the production of disease-free seed was confirmed.

Buxton (E. W.). **Differential rhizosphere effects of three Pea cultivars on physiologic races of Fusarium oxysporum f. pisi.**—*Trans. Brit. mycol. Soc.*, **40**, 3, pp. 305–316, 5 graphs, 1957.

Some of the results of this further investigation at Rothamsted Experimental

Station on pea wilt [**36**, p. 629] caused by *Fusarium oxysporum* f. *pisi* have already been noticed [**36**, p. 815]. The germination of conidia of a particular race of *F.o.* f. *pisi* was decreased by water extracts from the rhizosphere of a resistant cultivar (Alaska or Delwiche Commando), and good in those of a susceptible cultivar (Onward), an exception being race 3 spores, which germinated poorly in rhizosphere extract of Alaska, susceptible to this race.

When soils in which each of the 3 cultivars had grown were inoculated with race 1 and planted with Onward seedlings, wilting was severe in control soil not previously used for peas and in that which had contained Onward, but slower to develop and less pronounced in pots which had been cropped with either Alaska or Delwiche Commando.

YEN (D. E.) & CRUICKSHANK (I. A. M.). **The breeding of Peas resistant to Fusarium wilt.**—*N.Z. J. Sci. Tech.*, Sect. A, **38**, 7, pp. 702–705, 1957.

In joint breeding experiments by the Vegetable Station, Crop Research Division, Otahuhu, and the Plant Diseases Division, Auckland, pure-line selection and back-crossing were used to develop pea varieties resistant to wilt (*Fusarium orthoceras*) [var. *pisi*: **36**, p. 444]. Wilt-resistant lines of Greenfeast, William Massey, and Onward garden peas, and of Partridge and Blue Prussian field peas were obtained, indistinguishable in all main agronomic characters, including yield, from the wilt-susceptible lines they are intended to replace.

HARE (W. W.). **Mississippi Crowder, a new disease-resistant Cowpea.**—*Phytopathology*, **47**, 9, pp. 565–566, 1 fig., 1957.

This cowpea variety, highly resistant to race 1 and tolerant of races 2 and 3 of *Fusarium oxysporum* f. [*bulbigenum* var.] *tracheiphilum* [cf. **36**, p. 676], is described from Mississippi State College. It is similar to Brown Sugar Crowder.

ANDERSON (C. W.). **Seed transmission of three viruses in Cowpea.**—Abs. in *Phytopathology*, **47**, 9, p. 515, 1957.

Seed transmission in cowpea of 0–1% and 0·55%, respectively, was obtained for 2 strains of cowpea mosaic virus [**36**, p. 808] and of 4–28% for cucumber mosaic virus, all 3 being readily seed-borne in White Acre pea, but only cucumber mosaic virus in yardlong bean [*Vigna sesquipedalis*].

WELKIE (G. W.) & POUND (G. S.). **Temperature influence on the rate of passage of Cucumber mosaic virus through the epidermis of Cowpea leaves.**—Abs. in *Phytopathology*, **47**, 9, p. 537, 1957.

Primary leaves of cowpea were inoculated with cucumber mosaic virus, detached, and incubated on water agar at 16, 20, 24, and 28° C. Every hour a portion of epidermis was removed from half of each of several leaves. At any temp. lesion numbers increased in the stripped area the longer the time between inoculation and stripping. At lower incubation temperatures longer incubation periods prior to stripping were needed for lesion development in both the stripped and unstripped areas. Apparently temp. influenced the rate of virus passage through the epidermis to the mesophyll. Opt. temp. for max. lesion production (20°) was lower than that inducing the quickest virus passage through the epidermis (28°). With whole plants low internal temp. of intact leaves lessened the influence of high external temp. on rate of virus passage through the epidermis.

WALTER (J. M.) & LORZ (A. P.). **Florigreen. A disease-resistant Pole Bean.**—*Circ. Fla agric. Exp. Sta.* S-92, 8 pp., 2 fig., 1956. [Received Aug. 1957.]

The new pole bean [*Phaseolus vulgaris*], Florigreen, is a cross between F-M 191

and Pinto No. 5 and is the first product of a breeding programme initiated by the Florida Agricultural Experiment Stations in 1948. Florigreen has been consistently resistant to rust (*Uromyces phaseoli* [f.] *typica*) [*U. appendiculatus*: cf. **36**, p. 630] throughout 11 seasons at the Gulf Coast Station, Bradenton. It is also resistant to southern bean mosaic virus [loc. cit.] and bean [common] mosaic virus [cf. **36**, p. 801].

Bean rust.—*Agric. Gaz. N.S.W.*, **68**, 5, pp. 257–258, 1 fig., 1957.

One strain of *Uromyces phaseoli* [f.] *typica* [*U. appendiculatus*: **36**, p. 455] can attack almost all the varieties of bean [*Phaseolus vulgaris*] commonly grown in New South Wales; others do not infect dwarf varieties. The climber Westralia is worthy of trial for its resistance [**34**, p. 764].

Dusting the plants with a mixture of equal parts by weight of fine-grade sulphur and hydrated lime gives quite good control if the first application is made as soon as any sign of rust appears. Experiments on the far north coast have shown that zineb also gives good control without scorching the flowers when applied at $1\frac{1}{2}$ lb./100 gal. water every 7–10 days after the appearance of pustules.

Zaumeyer (W. J.). **Control of powdery mildew of Beans with two antibiotics.**—Reprinted from Antibiotics Annual, 1956–1957, Medical Encyclopedia, Inc., New York, 1957, pp. 1015–1018, 2 fig., 1957.

In recent experiments at Beltsville, Maryland, a single application of anisomycin (50 p.p.m.) or griseofulvin (200 p.p.m.) effectively eradicated powdery mildew (*Erysiphe polygoni*) from beans [*Phaseolus vulgaris*: cf. **36**, p. 339]; 1 application of either antibiotic was as effective as 2 or 3 applications at 2-day intervals. Anisomycin (100 p.p.m.) and griseofulvin (400 p.p.m.) also protected beans from rust (*Uromyces phaseoli* [f.] *typica*) [*U. appendiculatus*] and the anisomycin controlled downy mildew (*Phytophthora phaseoli*) on lima beans [*Phaseolus lunatus*: cf. **36**, p. 370].

Bremer (H.). **Zur Behandlung von Bohnensaatgut mit kombinierten Beizmitteln.** [On the treatment of Bean seed with combined dressings.]—*Anz. Schädlingsk*, **30**, 6, pp. 84–85, 1957.

At the Institut für Gemüsebau und Unkrautforschung, Neuss-Lauvenburg, Germany, of the various fungicide-insecticide combinations tested for the seed treatment of beans [*Phaseolus vulgaris*] captan and COBH, each with dieldrin, gave the best growth, and organic mercury with lindane the worst. Certain insecticides had an effect even in the absence of insect attack, apparently due to action on soil micro-organisms, the poor results with lindane [cf. **35**, p. 502] and the increase of infection by *Rhizoctonia crocorum* [*Helicobasidium purpureum*] associated with the use of aldrin probably being explicable in this way.

COBH with mercury gave good control of *Colletotrichum lindemuthianum*, 86 healthy seedlings developing from 100 infected seeds as compared with only 29, all infected, in the untreated.

Burke (D. W.). **Incidence of bacterial pathogens in dry Beans in irrigated districts of Nebraska, Wyoming and Colorado in 1954 and 1955.**—*Plant Dis. Reptr*, **41**, 5, pp. 488–490, 1957.

Corynebacterium flaccumfaciens, *C. f.* var. *auranticum* [**36**, p. 444], *Xanthomonas phaseoli*, and *X.p.* var. *fuscans* were present in an average of 68, 26, 5, and 2%, respectively, of the discoloured seeds of dry beans [*Phaseolus vulgaris*] sampled over 2 years and separated according to the shade of discoloration. Observations in Nebraska and Wyoming suggest that the pathogens are spread in wind-blown soil.

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